

ADH Technology Co. Ltd.

GSM/GPRS Module

Software Development Guide
<V1.31>

ADH Technology Co. Ltd.
www.adh-tech.com.tw

Revision History

No.	Date	Notes
V1.0	2008/8/28	<ul style="list-style-type: none">- Introduce AT commands step by step for phone call, SMS, TCP/UDP- Introduce sample code for phone call, SMS, TCP/UDP
V1.1	2008/9/1	<ul style="list-style-type: none">- Add important steps and notes for using TCP/UDP
V1.2	2008/9/8	Add Notice
V1.3	2008/10/1	Insert AT+CSCA? before send SMS with PDU mode
V1.4	2008/12/03	Change +CMGR to +CMGL for list SMS function

Confidential

Table of Content

TABLE OF CONTENT	3
MAKE A VOICE CALL	4
INITIAL SETTING.....	4
CASE1 NORMAL	4
CASE2 EXTENSION	4
SAMPLE CODE	5
SEND SMS	6
CASE1 TEXT MODE.....	6
CASE2 PDUMODE	6
RETRIEVE SMS	7
CASE1 RETRIEVE SINGLE SMS	7
CASE2 RETRIEVE ALL SMS.....	7
CASE3 RETRIEVE SMS UPON RECEPTION.....	7
SAMPLE CODE (FOR TEXT MODE).....	8
TCP.....	9
UDP.....	10
SAMPLE CODE	11
NOTICE.....	13
APPENDIX A	14
SETUP UP GPRS DIALUP CONNECTION IN WINDOWS.....	14

Make a voice call

Initial Setting

STEP	COMMAND	COMMENT	RESPONSE
1	Open Power		
2	AT+CPIN?	Confirm SIM Card Status	+CPIN: READY
3	AT+CSQ	Request signal status. "5" is current signal quality. "31" is maximum value. "99" means no service. Please wait for 10 seconds to query after module is turned on.	+CSQ: 5,99

Ps: Initial Setting is essential!

Case1 Normal

STEP	COMMAND	COMMENT	RESPONSE
1	ATD09xxxxxxxx;	Make a voice call. It's required to end with ";".	
2	ATH	Hang up the call	OK

Case2 Extension

STEP	COMMAND	COMMENT	RESPONSE
1	ATDxxxxxxxx;	xxxx as the main number	
2	AT+VTS="4";+VTS="8"; +VTS="7";+VTS="3"	In this example, the extension number is "4873".	OK
3	ATH	Hang up	OK

Sample code

```
private: System::IO::Ports::SerialPort ^ComPort; //use comport
String ^ATCmd = String::Empty;
ATCmd = String::Concat(ATCmd, "AT+CPIN?\r\n");
try {
    if ( m_ComPort->IsOpen ) {
        m_ComPort ->WriteTimeout = 300;
        m_ComPort ->Write(ATCmd);
        MessageBox::Show("Send Check SIM Card Status CMD OK");
    }
} catch (Exception^ texp ) {
    MessageBox::Show("Send SIM Card Status CMD Error", texp->Message);
}
```

* "AT+CPIN?\r\n" AT+CPIN? In the quotation can be replaced with other AT Command,

* When makinh a phone call to "0912345678", please use "ATD0912345678;"

Confidential

Send SMS

Case1 text mode

STEP	COMMAND	COMMENT	RESPONSE
1	AT+CMGF=1	Set to "text mode"	OK
2	AT+CMGS="09xxxxxxx"	Set receiving number	>
3	GOOD LUCK	Enter message content	
4	Press Control-Z	Termination character	+CMGS: 78 OK

Case2 PDU mode

STEP	COMMAND	COMMENT	RESPONSE
1	AT+CMGF=0	Set to PDU mode	OK
2	AT+CSCA?	Query service center address	+CSCA: "+886935874 443",145
3	AT+CMGS=23	23 bytes	>
4	0011000C91889611151 0270000AA0AE8329BF D4697D9EC37	Message content in PDU code: hellohello Red characters are recipient phone number: Swap 886911510172 by every two digits to become "88961151027" then to be entered in the red part of the sentence. PDU coding reference: http://www.dreamfabric.com/sms/	
5	Press Control-Z	Termination character	+CMGS: 78 OK

Retrieve SMS

Case1 Retrieve single SMS

STEP	COMMAND	COMMENT	RESPONSE
1	AT+CMGR=5	Retrieve a specific number of SMS (e.g. number 5 SMS). It needs to be executed at text mode	+CMGR: "REC READ", "+886911510172", "", "08/08/13,16:33:17+32" hold on 002?0911-921253? OK

Case2 Retrieve all SMS

STEP	COMMAND	COMMENT	RESPONSE
1	AT+CMGL="ALL"	Needs to be implemented at text mode	All SMS message in SIM card will be listed ...

Case3 Retrieve SMS upon reception

STEP	COMMAND	COMMENT	RESPONSE
1	AT+CNMI=2,1,0,0,0	At this mode, SMS will be stored into SIM card at reception. User can set not to store SMS message by: AT+CNMI=2,2,0,0,0	+CNMI: 2,1,0,0,0
2		Automatic retrieving SMS message upon reception	+CMTI:"SM",11 AT+CMGR=11 +CMGR="REC READ", "+886911510172", "", "08/08/13,16:39:17+32" nice?0911-921253?

Sample code (for text mode)

```
private: System::IO::Ports::SerialPort ^ComPort; //use comport

/*AT+CMGF=1*/
String ^StrCMGF = String::Empty;
StrCMGF= String::Concat(StrCMGF, "AT+CMGF=");
StrCMGF= String::Concat(StrCMGF, "1");
StrCMGF= String::Concat(StrCMGF, "\r\n");
try {
    if (ComPort->IsOpen) {
        ComPort->WriteTimeout = 300;
        ComPort->Write(StrCMGF);
        MessageBox::Show("CMGF=1 OK");
    }
} catch (Exception^ texp ) {
    MessageBox::Show(texp->Message, "CMGF=1 Error");
}

/*AT+CMGS="number"*/
String ^SMSSender = String::Empty;
SMSSender = String::Concat(SMSSender, "AT+CMGS=\");
SMSSender = String::Concat(SMSSender, "0912345678");
//change 0912345678 to the phone number you will send to
SMSSender = String::Concat(SMSSender, "\r\n");
try {
    if (ComPort->IsOpen) {
        ComPort->WriteTimeout = 300;
        ComPort->Write(SMSSender);
        MessageBox::Show("Send Short Message OK");
    }
} catch (Exception^ texp ) {
    MessageBox::Show(texp->Message, "Send Short Message Error");
}

/*Send Content*/
String ^SMSContent = String::Empty;
SMSContent = String::Concat(SMSContent, "XXX");
//change XXX to the content you will send
SMSContent = String::Concat(SMSContent, "\x1A"); //Control-Z
try {
    if (ComPort->IsOpen) {
        ComPort->WriteTimeout = 300;
        ComPort->Write(SMSSender);
        MessageBox::Show("Send Content Message OK");
    }
} catch (Exception^ texp ) {
    MessageBox::Show(texp->Message, " Send Content Error");
}
```


TCP

STEP	COMMAND	COMMENT	RESPONSE
1	AT+CPIN?	Confirm SIM Card Status	+CPIN: READY
2	AT+CSQ	Check signal status	+CSQ: 5,99
3	AT+CREG=1	Show status of network registration	OK
4	AT+CREG?	Check status of network registration	+CREG: 1,1
5	ATE0	Switch off echo	OK
6	AT+AIPDCONT="INTERNET"	Attach to internet	+AIPDCONT: "INTERNET", "", ""
7	AT+AIPA=1	Connect to designated IP address	+AIPA:1,221.120.6.147,5
8	AT+AIPO=1,,"xxx.xxx.xxx.xx",10000,0	Open socket ID 1, connect to server at given IP.10000 is port number, 0 is tcp mode	(tcpIP)bsd_connect timeout=30000 +AIPO:1,6934,"xxx.xx x.xxx.xx",10000,0,0
9	AT+AIPW=1,"414243"	Write "ABC" in ASCII code	+AIPW: 1,0,7300,5840,3 OK +AIPRTCP:1,0,7300,5840,3,"414243"
10	AT+AIPC=1	Close socket ID 1	+AIPC: 1
11	AT+AIPA=0	Disconnect	+AIPA: 0,307

- You can use "AT+CPIN?" and "AT+CSQ" to check if the module is ready or not. Alternatively you can also use "+CREG" to check module readiness. Once you use "AT+CREG=1" command to display module status, you will get "+CREG: 1" every time when module is initiated.
- Please use "ATE0" to switch off echo message before using the TCP/UDP commands

UDP

STEP	COMMAND	COMMENT	RESPONSE
1	AT+CPIN?	Confirm SIM Card Status	+CPIN: READY
2	AT+CSQ	Acquire signal status	+CSQ: 5,99
3	AT+CREG=1	Show status of network registration	OK
4	AT+CREG?	Check status of network registration	+CREG: 1,1
5	ATE0	Switch off echo	OK
6	AT+AIPDCONT="INTERNET"	Connect to internet	+AIPDCONT: "INTERNET", "", ""
7	AT+AIPA=1	Connect to a given IP address	+AIPA:1,221.120.6.147,5
8	AT+AIPO=1,,"xxx.xx.xxx.xx",12000,1	Open socket ID 1, connect to server at given IP,12000 is port number, 1 is UDP mode	+AIPO:1,0,"xxx.xx.xxx.xx",12000,1
9	AT+AIPW=1,"414243"	Write "ABC"ASCII code	+AIPW: 1,1,0,0,3 OK +AIPRUDP: 1,1,0,0,3,"414243"
10	AT+AIPC=1	Close socket ID 1	+AIPC: 1
11	AT+AIPA=0	Disconnect	+AIPA: 0,307

Sample code

* The code of checking comport readiness is omitted here. User needs to add these codes before connection.

* Comport.write(szCommands) and Comport.read(szResponse) are pre-defined functions, aiming to write and read comport.

* Initialization

```
// Check if connect to GSM/GPRS module with UART
char szCommands [] = "AT\r\n";
//before send command, you had better to check if the ComPort is ready on not first
Comport.write(szCommands);

Comport.read(&szResponse);
if ( szResponse == "OK" ) {
    // Conncted to GSM/GPRS MODULE successfully, and the system start
}

// Check if GSM/GPRS module is ready to work (have attached system network service).
char szCommands [] = "AT+CSQ\r\n";
Comport.write(szCommands);

Comport.read(&szResponse);
if ( GetATCSQValue(szResponse) != 99 ) {
    // Range value of response "+CSQ" message is 0 to 31.
}

char szCommands [] = "AT+ATE0\r\n";
Comport.write(szCommands);
char szCommands [] = "AT+CREG=1\r\n";
Comport.write(szCommands);

char szCommands [] = "AT+CREG?\r\n";
Comport.write(szCommands);

Comport.read(&szResponse);
if ( GetATCSQValue(szResponse) != "+CREG: 1,1" ) {
    // GSM/GPRS module have attached to network.
}
}
```

* set GPRS service parameter

```
char szCommands [] = "AT+AIPDCONT=\\Internet\\'\r\n";
Comport.write(szCommands);

Comport.read(&szResponse);
if ( szResponse == "OK" ) {
    // APN parameter has been set.
}
}
```

* Attach GPRS network

```
char szCommands [] = "AT+AIPA=1\r\n";
Comport.write(szCommands);

Comport.read(&szResponse);
if ( szResponse == "OK" ) {
    // GSM/GPRS module has attached to GPRS network.
}
}
```

* Make a Connection

In this example, socket ID 1 is open and the module is connected to server IP
UDP connection (UDP mode=1), port number is 12000,
TCP mode=0, port number is 10000

Note TCP & UDP connections cannot be connected to socket ID 1 at the same time.

UDP:

```
char szCommandUDPs [] = "AT+AIPO=1,,\"203.160.252.54\",12000,1\r\n";  
Comport.write(szCommandUDPs);  
  
Comport.read(&szResponse);  
if ( szResponse == "OK" ) {  
    // GSM/GPRS module has create UDP socket, and ready to send data with UDP socket.  
}
```

TCP:

```
char szCommandTCPs [] = "AT+AIPO=1,,\"203.160.252.54\",10000,0\r\n";  
Comport.write(szCommandTCPs);  
  
Comport.read(&szResponse);  
if ( szResponse == "OK" ) {  
    // GSM/GPRS module has established TCP connect to remote server and the connection  
    // is ready.  
}
```

* Send data

```
char szCommandDats [] = "AT+AIPW=1,,\"56565656\"\r\n";  
Comport.write(szCommandTCPs);  
  
Comport.read(&szResponse);  
if ( szResponse == "OK" ) {  
    // GSM/GPRS module has send data to remote server with this socket ID  
}
```

* Close socket ID 1

```
char szCommands [] = "AT+AIPC=1\r\n";  
Comport.write(szCommands);  
  
Comport.read(&szResponse);  
if ( szResponse == "OK" ) {  
    // GSM/GPRS module close this connection for TCP or socket fot UDP  
}
```

* Detach GPRS network

```
char szCommands [] = "AT+AIPA=0\r\n";  
Comport.write(szCommands);  
  
Comport.read(&szResponse);  
if ( szResponse == "OK" ) {  
    // GSM/GPRS module has detached GPRS network.  
}
```

Notice

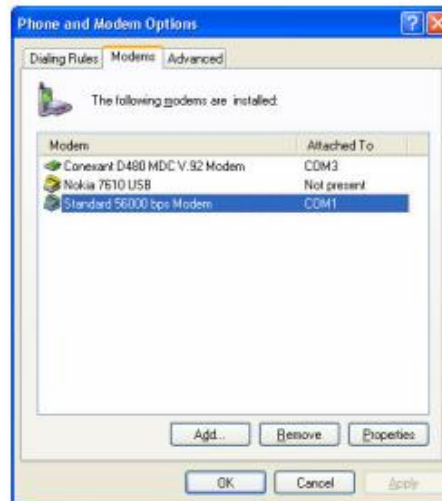
- When using this module to connect to network through GPRS with 3rd party software, the 3rd party software might send commands to change value setting without user's notice. For example, while using Windows to connect to the Internet through GSM module, the software reset ATE/ATS0/ATV/CMGF setting to factory default value.
- Before using MCU or other method to send the AT command to module, it's set ATE0 first to turn off the echo message.
- In order to prevent conflict between AT commands and response messages, it's highly recommended to send succeeding AT command *after* receiving the response (i.e., "OK") of previous AT command.
- When the system reboots due to unexpected interruption, a response error message will be sent from the system. It's recommended to ignore that message.

Confidential

Appendix A

Setup up GPRS dialup connection in Windows

Step 1) From Menu Start, Setting, Control Panel, select Phone and Modem Options.



Note:

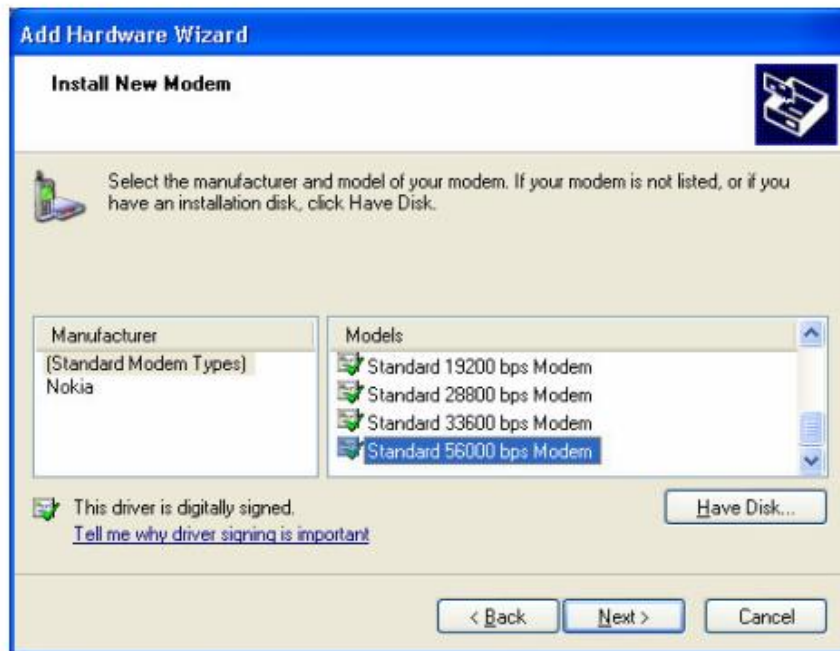
If "Standard 56000bps V90 Modem COM1" not available then:

a) Add...

b) Select "Don't detect my modem; I will select it from a list"



c) Select "Standard modem type: Standard 56000 bps V90 Modem"

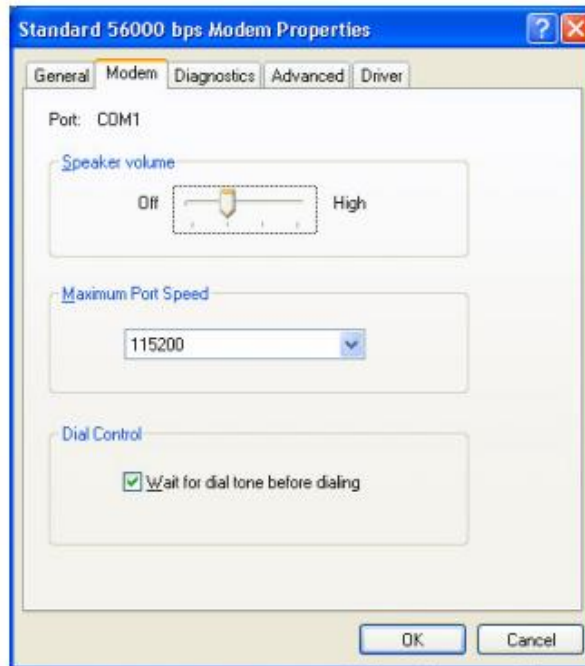


d) Select "COM 1"



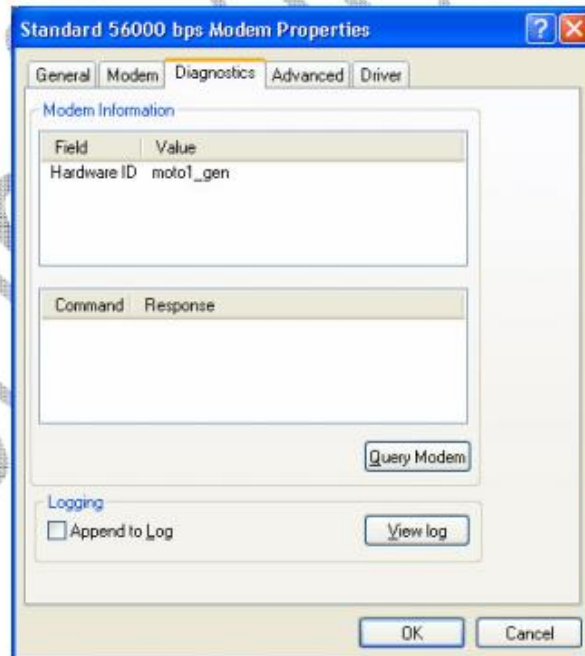
NOTE : If "COM 1" not available the check no other program is using COM1 port.

Step 1.1) With the following properties:



Note: Check carefully the speed!

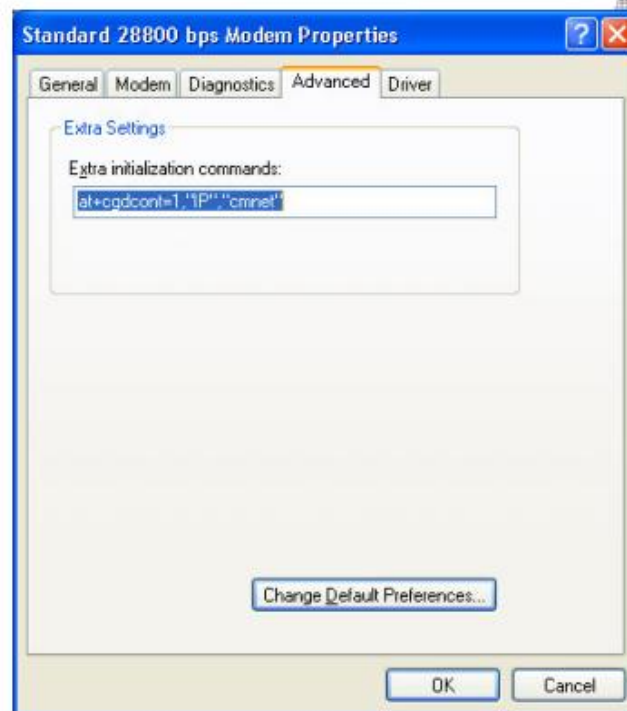
Step 1.2) Menu Diagnostics:



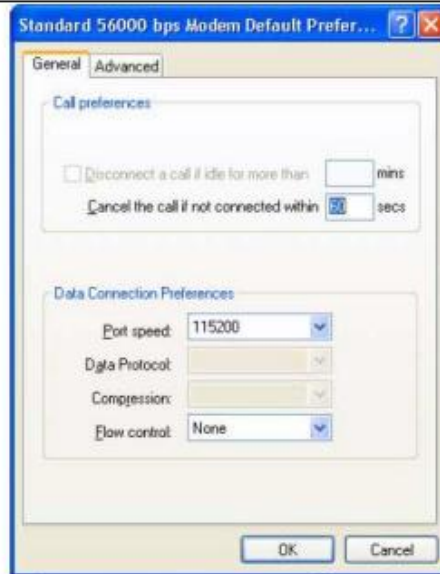
Step 1.3) Menu Advanced has to be set depending on the network:

For SFR: at+cgdcont=1,"IP","websfr" For Orange:
at+cgdcont=1,"IP","orange.fr" For China Mobil:
at+cgdcont=1,"IP","cmnet" For KGT:
at+cgdcont=1,"IP","internet" For CHT:
at+cgdcont=1,"IP","wappie"

Note: Do NOT copy the above text. Retype it directly into the window as the font can cause a problem.

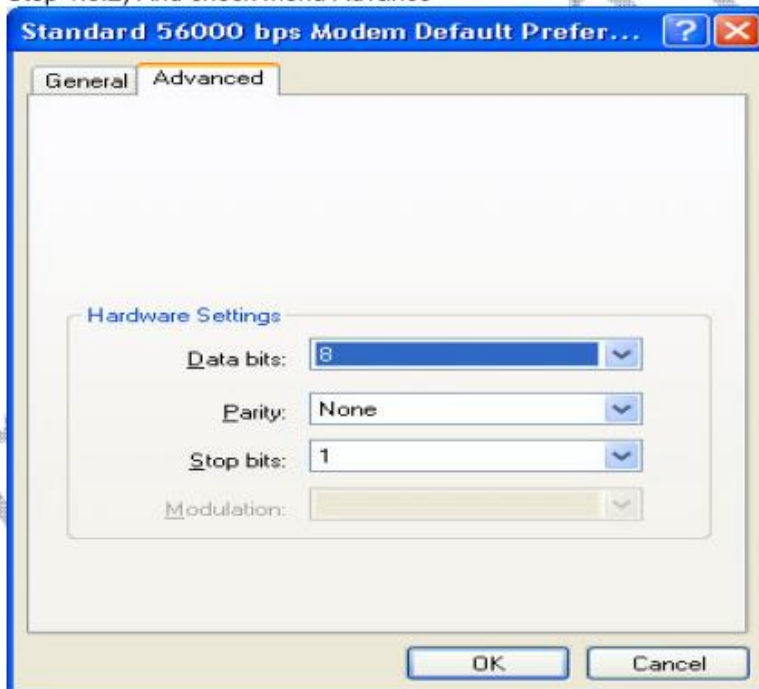


Step1.3.1) Check the "Change Default Preferences":

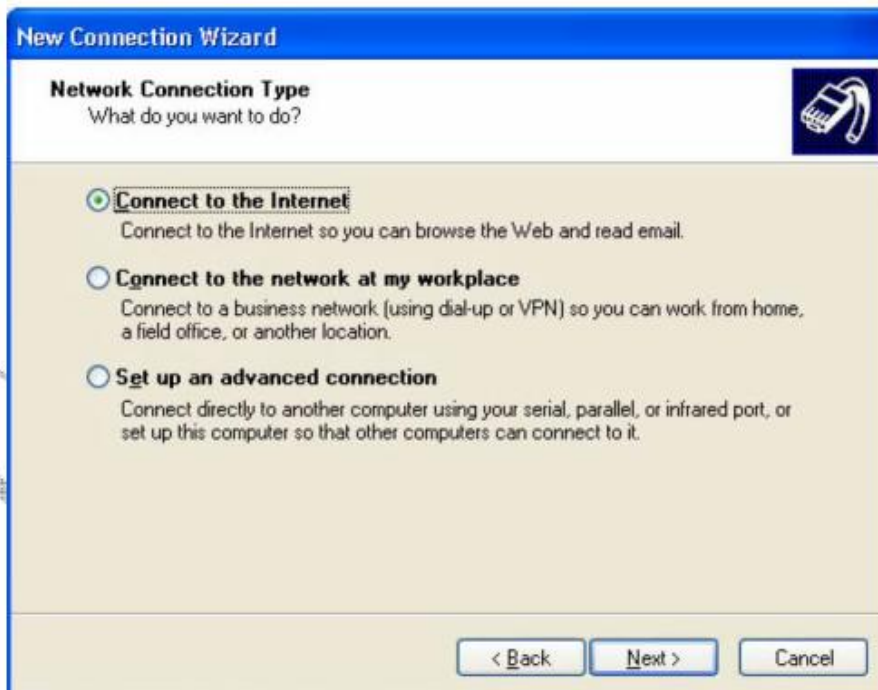


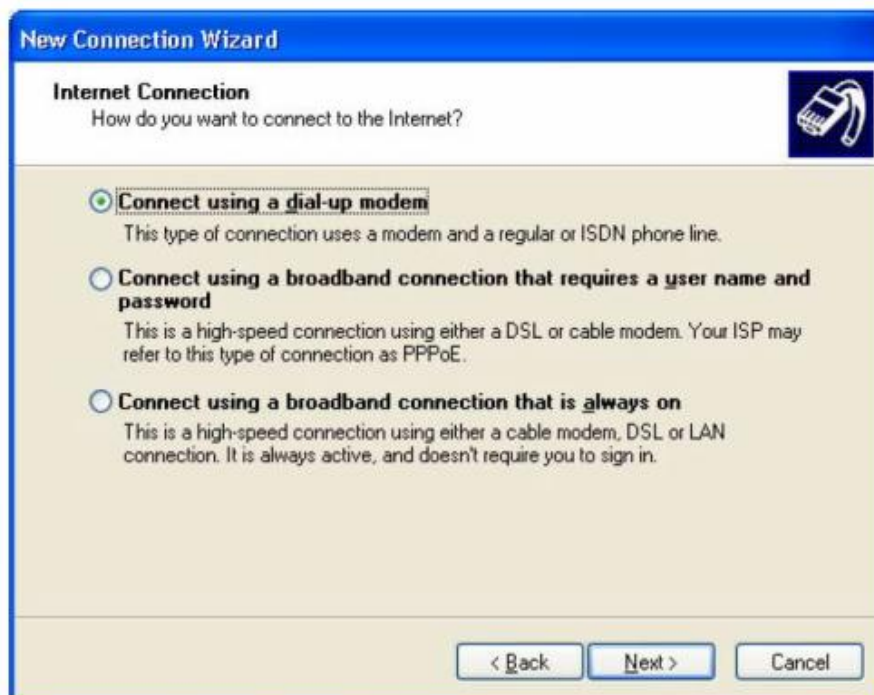
Note: Check the port speed:

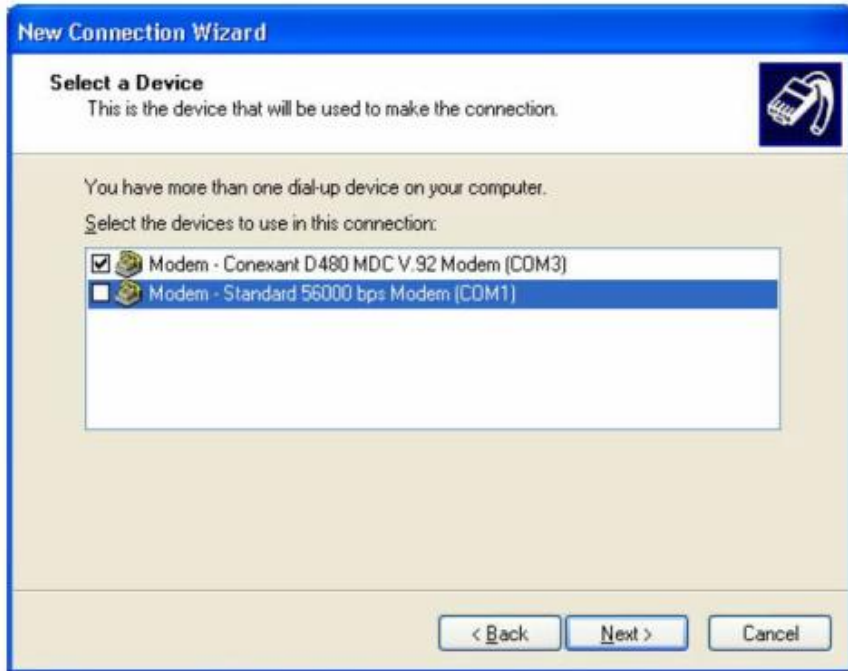
Step 1.3.2) And check menu Advance



Step 2) From Menu Start, Settings, Network and Dial Up Connections, Make a New Connection







New Connection Wizard

Phone Number to Dial
What is your ISP's phone number?



Type the phone number below.

Phone number:

You might need to include a "1" or the area code, or both. If you are not sure you need the extra numbers, dial the phone number on your telephone. If you hear a modem sound, the number dialed is correct.

< Back Next > Cancel

New Connection Wizard

Connection Availability
You can make the new connection available to any user or only to yourself.



A connection that is created for your use only is saved in your user account and is not available unless you are logged on.

Create this connection for:

Anyone's use
 My use only

< Back Next > Cancel

New Connection Wizard

Internet Account Information
You will need an account name and password to sign in to your Internet account.

Type an ISP account name and password, then write down this information and store it in a safe place. (If you have forgotten an existing account name or password, contact your ISP.)

User name:

Password:

Confirm password:

Use this account name and password when anyone connects to the Internet from this computer

Make this the default Internet connection

Turn on Internet Connection Firewall for this connection

< Back Next > Cancel

New Connection Wizard

Completing the New Connection Wizard

You have successfully completed the steps needed to create the following connection:

GPRS

- Make this the default connection
- This connection is firewalled
- Share with all users of this computer
- Use the same user name & password for everyone

The connection will be saved in the Network Connections folder.

Add a shortcut to this connection to my desktop

To create the connection and close this wizard, click Finish.

< Back Finish Cancel

Step 3) From Menu Start , Setting , Network connections , GPRS Note: Local Area should be disable and also any other network/connection

Step 4) Double click Connect GPRS:

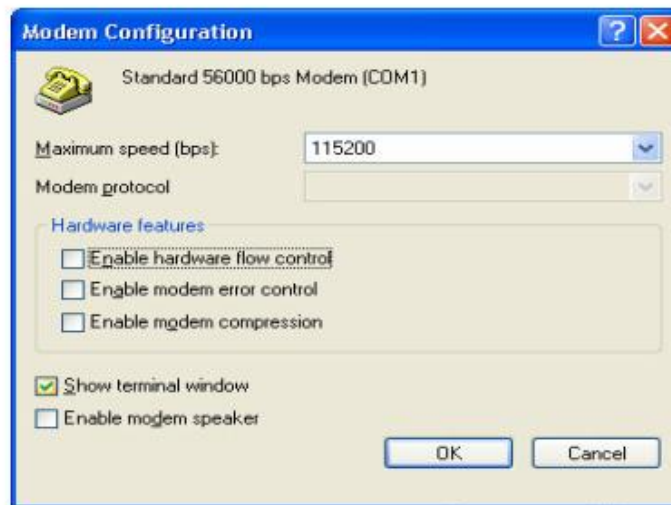


Step 4.1) Check the properties:



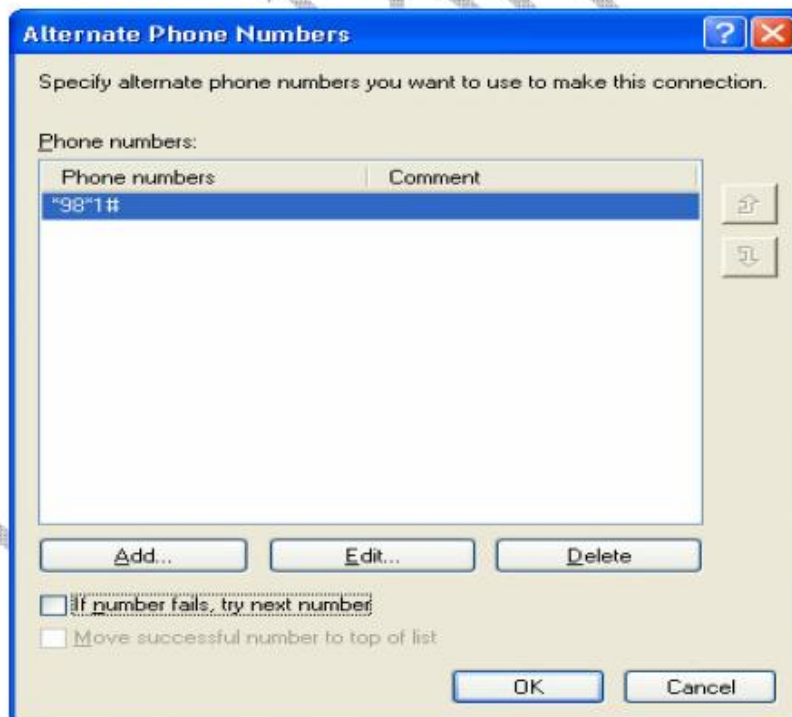
Note:

For GPRS, set phone number as *98*1#
For GSM, set the phone number as 17201



Note: Check the Maximum speed (bps):

Note: For SSME, 'Enable hardware flow control' should be cancelled!



Step 4.2) Back to menu GPRS, check Options:



Step 4.2.1) Check menu X.25, which will be not active:



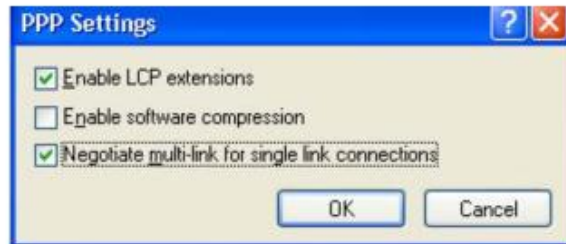
Step 4.3) Back to menu GPRS, check Security:



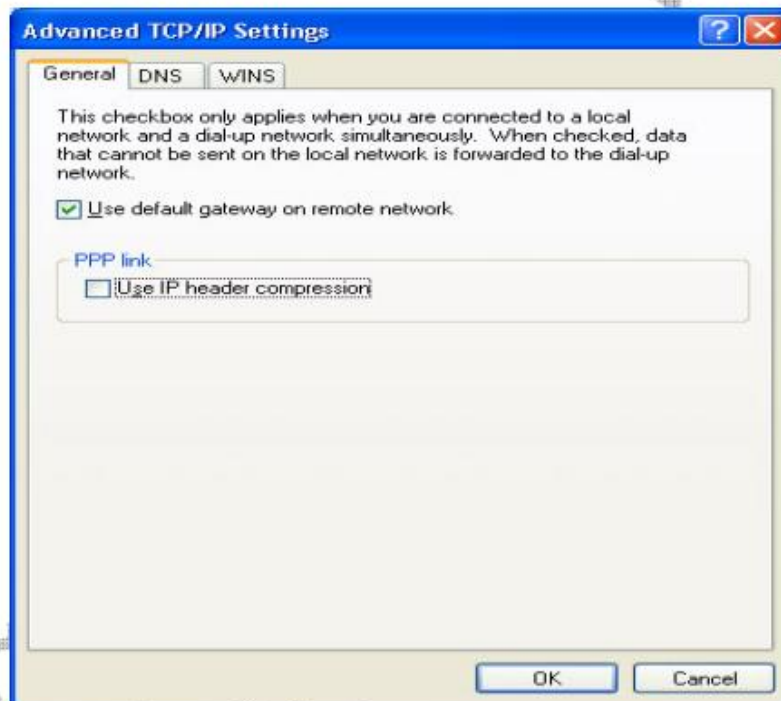
Step 4.4) Back to menu GPRS, check Networking:

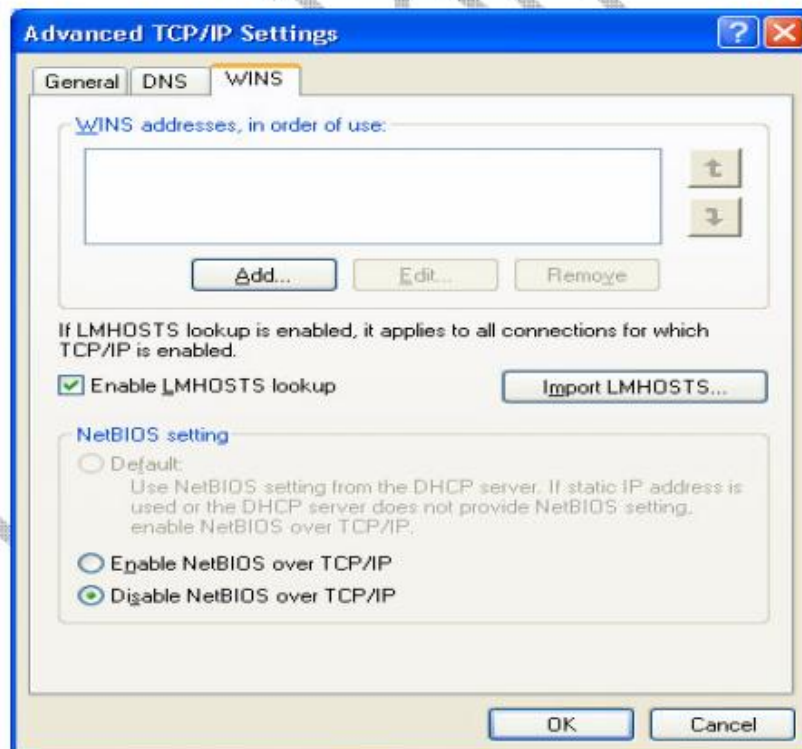
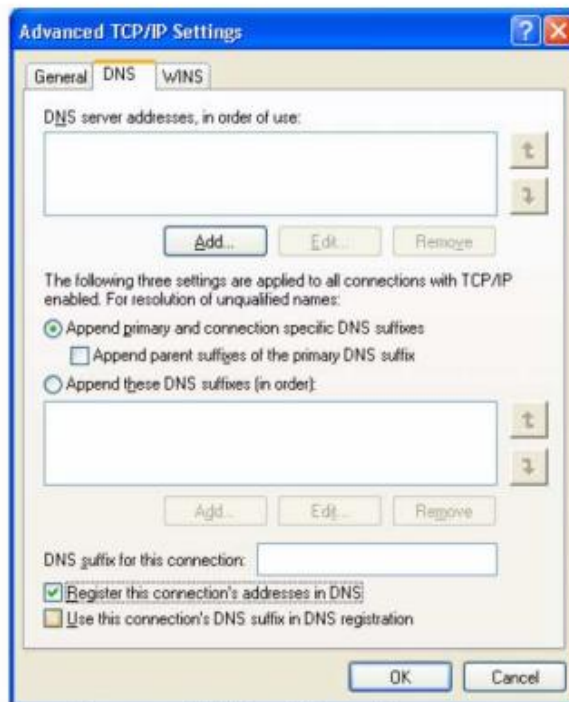


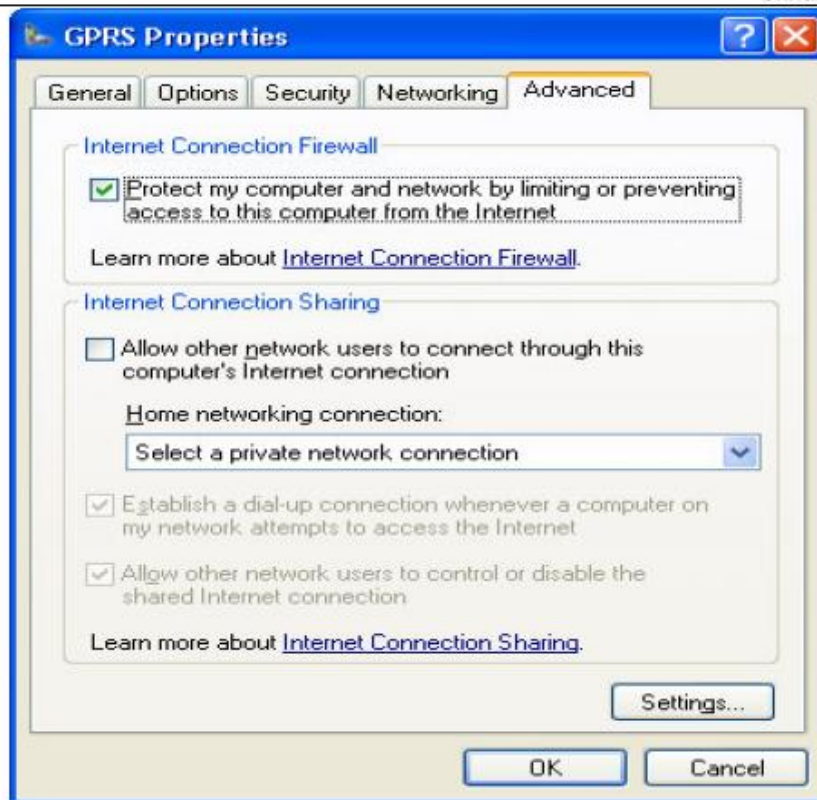
Step 4.4.1) Check the Setting of PPP:



Step 4.4.2) And check the Properties of Internet Protocol TCP/IP
Step 4.4.2.1) Menu Advanced:







The check of the Setting is finished. After the mobile is switched on and it attached GPRS, you can try the connection described above.

Step 4.6) Back in Connect GPRS window.



Notes 1:
If GPRS: User name: empty Password: empty
If GSM: User name: 172 Password: 172
Click Dial to make a connection.

Confidential