How to use Airlink Raven CDMA/GPRS Modems with Z-max ?

1   Introduction

This document provides all technical information required in order to connect CDMA or GPRS Airlink modem to:

- o   a Z-max base
- o   an iCGRS base or any other GPS station that is streaming data on a socket (IP address and port number)

This procedure is only valid for the following modems from Airlink:
- Raven GPRS modem G3210 or G3211
- Raven CDMA modem C3210

For the use of Airlink GSM or CDMA modem a special kit from Thales Navigation is designed : Kit external Raven modem for Z-max (Ref:990572-01).This kit includes the following items:
- A Serial cable (Ref:702078) to connect the serial port of Z-max to the modem
- A power cable (Ref: 702079) to power the modem from a battery
- A 11.1V / 6Ah Li-Ion battery (Ref:110284)
- A battery charger (Ref:110049)
- A Blue backpack RTK Z-max (Ref:205044)

2 CDMA/GSM connection to a Z-max base

2.1 Modem activation

The modem activation is a procedure that allow to the modem to be registered to the selected wireless operator. This procedure has only to be done for the first use of the modem. This procedure must be done for the rover and the base modems.
You should refer to the appendix 1, to activate the CDMA or GSM modem.

2.2 Modem configuration

The modem configuration is a procedure that allow to the modem to be configured in order to initialize the modem for the base and to dial the base phone number for the rover. In the case of a connection to a Z-max base, the connection will be based on Circuit Switched Data connection, with invoice based on the duration of communication. Please refer to you local wireless operator to know more about billing.

2.2.1 Base side

The Allegro terminal with FastSurvey shall be connected to Z-max either by Bluetooth wireless link or serial cable to port A.

Port A   Serial cable
                or
                Bluetooth
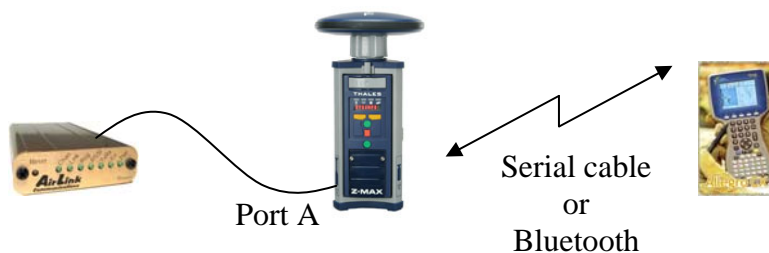
In Fast Survey utility you will find, a terminal utility that allow sending command to Z-max.

Send the following commands to Z-max for initializing the base modem:

Commands to send with Allegro terminal connected to port B of Z-max:

Command to send to Z-max	Response from Z-max	Comments
$PASHS,SPD,A,9	$PASHR,ACK	Set PortA in 115.2Kbps
$PASHS,DSY,A,B<CR><LF>	$PASHR,ACK	Set Z-max in transparent mode
$PASHS,DSY,B,A<CR><LF>	$PASHR,ACK	Set Z-max in transparent mode
AT\APASSTHRU<CR><LF>	OK	Wait 30 seconds before continue
ATS0=1<CR><LF>	OK	Set the number of ring before connection
$PASHS,DSY,OFF<CR><LF>	$PASHR,ACK	Remove the transparent mode

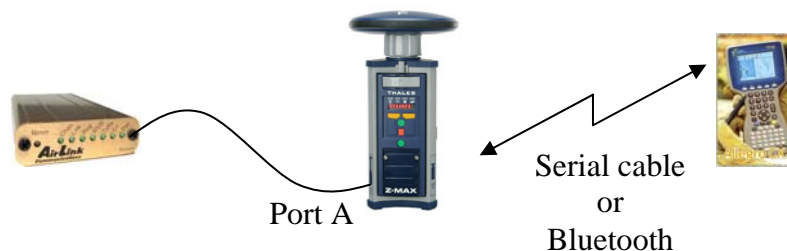Commands to send with Allegro terminal connected to Z-max through Bluetooth

Command to send to Z-max	Response from Z-max	Comments

$PASHS,SPD,A,9	$PASHR,ACK	Set PortA in 115.2Kbps
$PASHS,DSY,A,C<CR><LF>	$PASHR,ACK	Set Z-max in transparent mode
$PASHS,DSY,C,A<CR><LF>	$PASHR,ACK	Set Z-max in transparent mode
AT\APASSTHRU<CR><LF>	OK	Wait 30 seconds before continue
ATS0=1<CR><LF>	OK	Set the number of ring before connection
$PASHS,DSY,OFF<CR><LF>	$PASHR,ACK	Remove the transparent mode

The CDMA/GSM modem base is initialized, and ready to be used by the rover.

2.2.2   Rover side

The Allegro terminal with FastSurvey shall be connected to Z-max either with Bluetooth wireless link or serial cable to port A.

Port A   Serial cable
or
Bluetooth

In Fast Survey utility you will find, a terminal utility that allow sending command to Z-max.

2.2.2.1   Dialing to the base

Commands to send with Allegro terminal connected to port B of Z-max

Command to send to Z-max	Response from Z-max	Comments
$PASHS,SPD,A,9	$PASHR,ACK	Set PortA in 115.2Kbps
$PASHS,DSY,A,B<CR><LF>	$PASHR,ACK	Set Z-max in transparent mode
$PASHS,DSY,B,A<CR><LF>	$PASHR,ACK	Set Z-max in transparent mode
AT\APASSTHRU<CR><LF>	OK	Wait 30 seconds before continue
ATD Base Phone Number	OK	Dial to the base phone number
$PASHS,DSY,OFF<CR><LF>	$PASHR,ACK	Remove the transparent mode

Commands to send with Allegro terminal connected to Z-max through Bluetooth

Command to send to Z-max	Response from Z-max	Comments
$PASHS,SPD,A,9	$PASHR,ACK	Set PortA in 115.2Kbps
$PASHS,DSY,A,C<CR><LF>	$PASHR,ACK	Set Z-max in transparent mode
$PASHS,DSY,C,A<CR><LF>	$PASHR,ACK	Set Z-max in transparent mode
AT\APASSTHRU<CR><LF>	OK	Wait 30 seconds before continue
ATD Base Phone Number	OK	Dial to the base phone number
$PASHS,DSY,OFF<CR><LF>	$PASHR,ACK	Remove the transparent mode

After a few seconds the rover is connected to the base, and receive data from the base

2.2.2.2   Hang-up the rover
Just disconnect the Airlink modem from its power source.

3 CDMA/GPRS connection to iCGRS

3.1 Modem activation

The modem activation is a procedure that allow to the modem to be registered to the selected wireless operator. This procedure has only to be done for the first use of the modem.

You should refer to the appendix 1, to activate the CDMA/GPRS modem.

## 3.2 Modem installation for the rover

Before using the Airlink modem, you need to configure the modem and Zmax, in order the connection to iCGRS be automatic after power on of the modem. This configuration procedure must only be done at the first use of the modem.

3.2.1 First step - configuration of the modem

What you need :

- A computer with a serial port
- A Airlink Raven modem (GPRS or CDMA) and its antenna
- A serial cable used for connecting the Raven modem to your computer
- A power source for supplying the modem (see the Li-Ion battery provided by Thales)
- The public IP address and port number of the iCGRS on which you want to be connected, or any other server that is streaming data on a given socket.
- WirelessAce software on your computer (You can download it at http://www.airlink.com/support/modems/modem_utils.asp)

Execute the WirelessAce software, and select the connect button with PPP:COM1 if the Airlink modem is connected on COM1 and enter 12345 for password (default value)
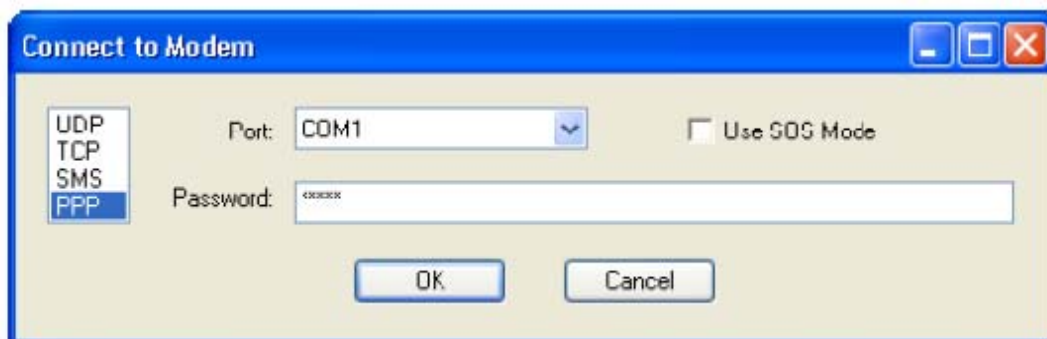
The following screen should appear:
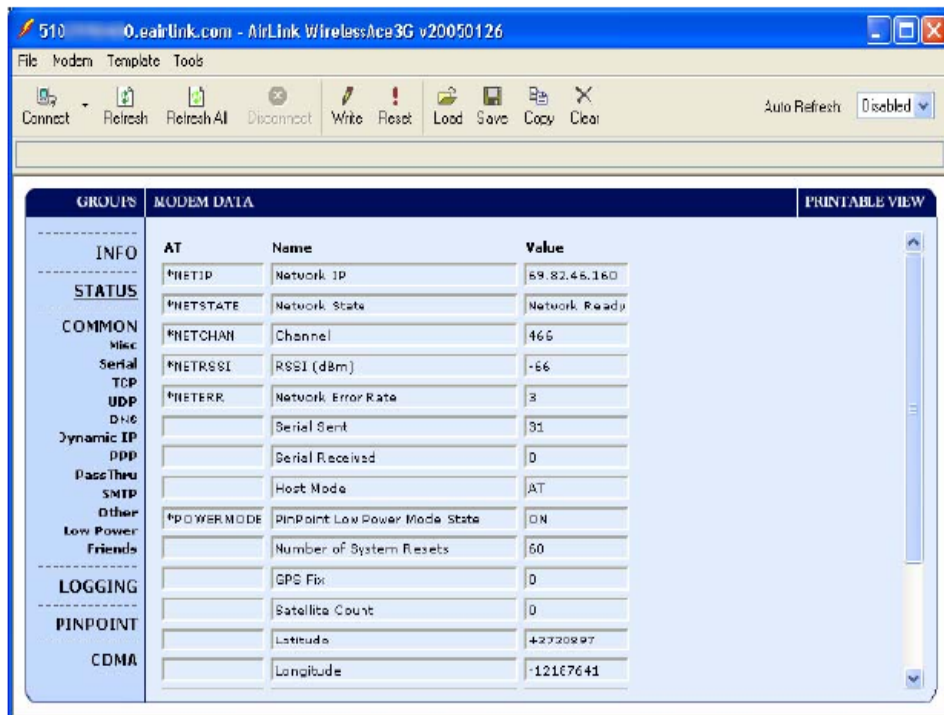
Once all parameters are displayed on the screen modify the following parameters:

- S53 Destination address -> Set the IP address of the iCGRS station (Ask to the iCGRS manager which IP address is given for the iCGRS)
- S53 Destination port -> Set the selected port of the iCGRS station (Ask to the iCGRS manager which port number is allocated to you)
- S53 Default Dial Code =T
- MD Startup Mode Default =4
- S211 DTR Mode = 1
- TCPS Connection timeout unit =0
- TCPT Connection timeout (minute) =1

Then click "write" for saving these parameters into the modem.

The modem is ready to use.

3.2.2   Second step – configuration of Z-max

What you need:

- A Field terminal like allegro (optional: a serial cable to connect the Allegro terminal to Z-max) with FastSurvey
- A Z-max rover
- A Battery module or any other source power compatible with Z-max

Serial cable
or
Bluetooth
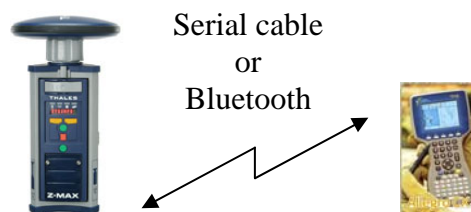
Execute FastSurvey, and after initializing the connection with Z-max :

- Select the "Equip" tab.
- Select "Receiver utilities" button
- Select "Send command to receiver"
- Send the following command to the receiver followed by OK

Command to send to Z-max (*)	Response from Z-max	Comments
$PASHS,SPD,B,9	$PASHR,ACK	Set PortB in 115.2Kbps
$PASHS,PRT,B,232	$PASHR,ACK	Set port B in RS232 mode
$PASHS,NME,GGA,B,ON	$PASHR,ACK	Send GGA message to port B in order to intiate the connection to iCGRS
$PASHS,SAV,Y	$PASHR,ACK	Save this configuration into Z-max

(*) You can also use a computer, with the appropriate cable connected to Z-max, and send these command with Hyperterminal software utility from Windows suite.

3.2.3   Third step – Using Z-max with Airlink modem

What you need:

- A Z-max rover
- A Airlink Raven modem (GPRS or CDMA)
- A serial cable for connecting the Airlink /Raven modem to Z-max (Ref:702078)
- A cable for connecting the modem to the battery (Ref: 702079)
- A 11.1V 6Ah Li-Ion Battery (Ref:110284)
- All traditional accessories required for on the field work

The Allegro terminal with FastSurvey shall be connected to Z-max either by Bluetooth wireless link or serial cable to port A.

« Y » cable

Port A

Port B

Serial cable
or
Bluetooth
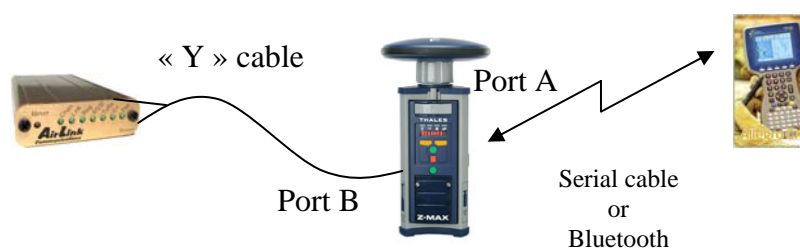
It is not necessary to send specific command to Z-max, or fast Survey: As soon as the Airlink Raven modem is powered, an automatic connection procedure will occur to the iCGRS station selected during the first step of configuration.

Z-max is ready to be used for RTK operation, with correction data on portB.

3.2.4 Hang-up

Just disconnect the Airlink modem from its power source.

4 Reminder

Port A or B provides serial link and power access to Z-max.

Port A	Port B
RS-232 serial link: • With hardware (RTS/CTS) flow control software enabled/disabled	RS-232 / RS-422 serial link • RS232 or 422 selection through $PASHS command • In case of RS422 no hardware flow control
+12V DC power: • Current shall be lower than 800mA • Protected against short-circuit	+12V DC power • Current shall be lower than 800mA • Protected against short-circuit
Pinout: 1- +12V DC voltage 2- GND 3- CTSA 4- RTSA 5- RXDA 6- TXDA 7- 1 PPS OUT	Pinout: 1- +12V DC voltage 2- GND 3- CTSA/RX- 4- RTSA/TX+ 5- RXDA/RX+ 6-TXDA/TX- 7- EVENT

5 Troubleshooting

Symptoms	Action
Z-max is not responding	• Check the cable or the Bluetooth link • Check if the baud rate match with current baud rate in Z-max
No response after a dial to a Z-max base	• Check the connection of the antenna on the modem • Check with a cell phone if the area is covered by the operator • Check the power and the configuration of the base • Check that Z-max is not busy (already online)
No response after a dial to a iCGRS station	• Check the connection of the antenna on the modem • Check with a cell phone if the area is covered by the operator • Check IP and port parameters of the station • Check the port is not busy (already online)
Frequently disconnection to the base	• Check the connection of the antenna on the modem
No response after AT command	• Check baud rate of port A (115.2Kbps) • Check the +12V power of the modem. In any case the voltage shall be between 10 and 28V

Appendix 1

Activation of CDMA and GPRS Raven modem
From Airlink

How to activate CDMA and GPRS Airlink Raven Modem ?

CDMA Raven modem for Verizon operator :

1) Before activate the modem you need the following items:

- 1 PC with XP or Win2K Operating System
- 1 CDMA Raven modem for Verizon C3210, its antenna and a source of power
- 1 Serial cable to connect the modem to your PC
- 1 software from Airlink Setup wizard for Verizon that can be downloaded at the Airlink Web site (http://www.airlink.com/support/modems/modem_utils.asp).The file to download is "SetupWizard1.zip" for Verizon operator . If you do not have .NET installed on your PC you will have to download the "SetupWizard2.zip" instead.
- The Phone number provided by the operator. For this, the operator will require the ESN number given on the label of the modem.

2) To activate the modem follow this procedure:

- Connect the modem to the PC through the serial cable
- Connect the antenna and the power to the modem
- Install the downloaded Setup Wizard software on the PC by using unzip utility
- Execute the Setup Wizard software in the Windows Start Program menu, **unselect** "Setup a DUN connection" and then select Next

- Select the serial port on which the modem is connected and then Next

- Check the ESN number of the modem and then Next

- Skip this step by selecting Next
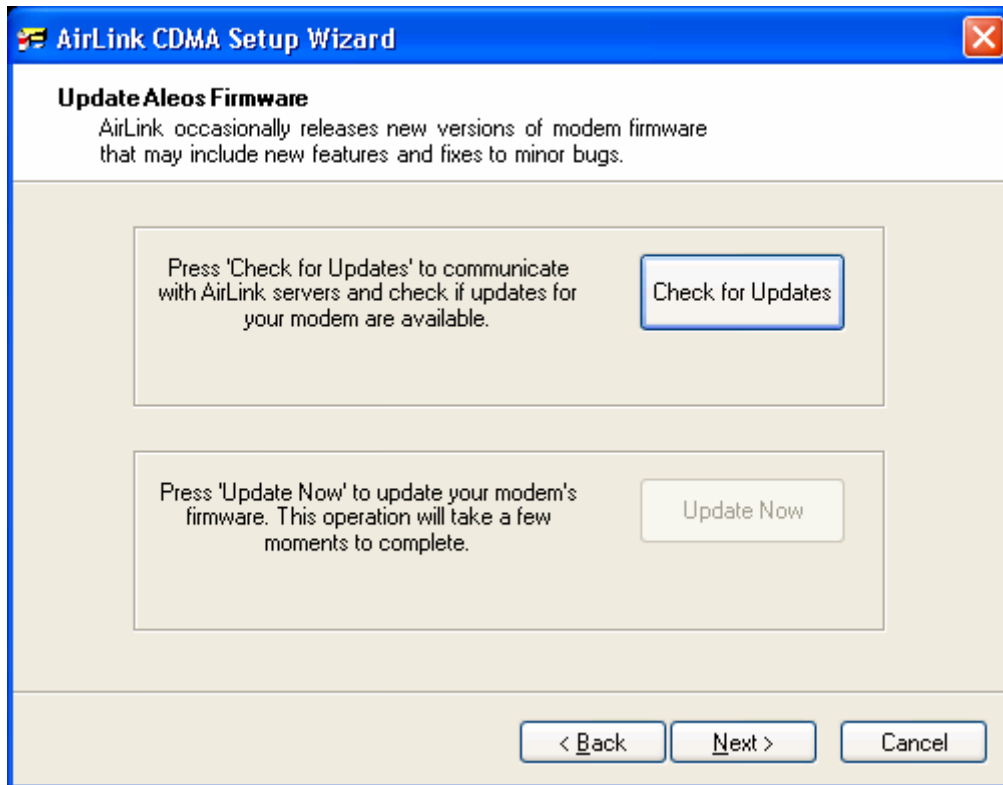
- Input the MSL code (for Verizon it should be 000000) and then Next
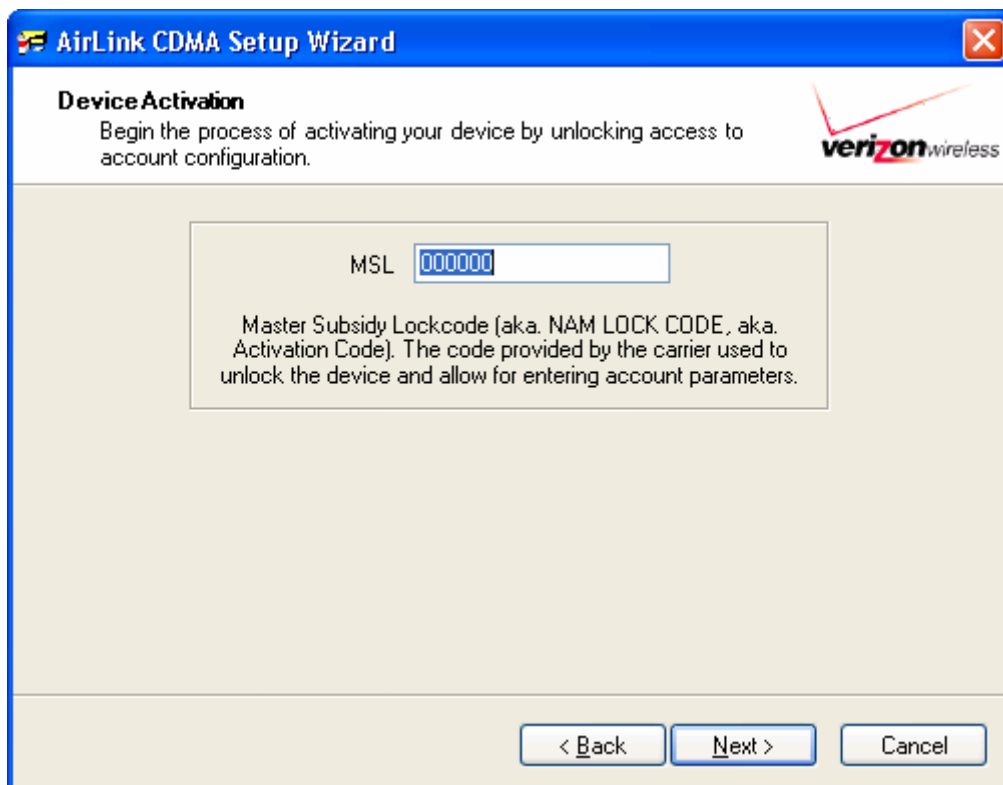
- Input the Phone number given by the operator in the MDN field and then next

- Except if the provider give you the SID and NID parameters skip this section by next

- Except if the provider give you different values for NAI and Password parameters skip this section with next

AirLink CDMA Setup Wizard

Device Activation
Configure parameters required for network access.

verizon wireless

NAI [9097625420] @ [vzw3g.com]
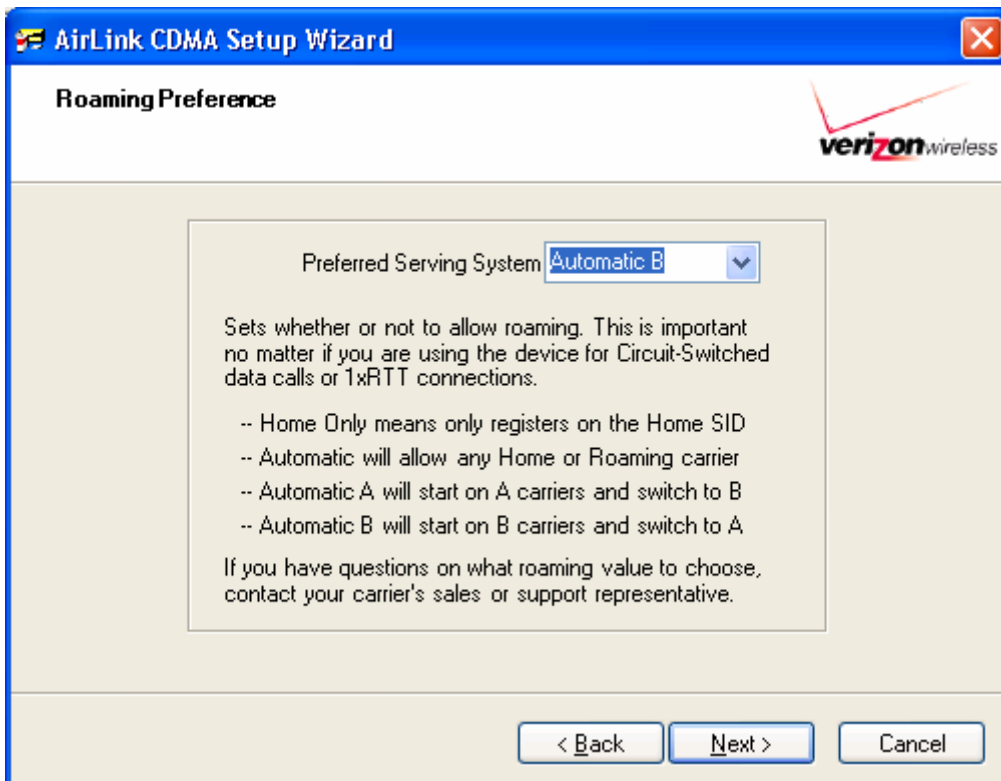
Network Access Identifier
The NAI is the username required to log on to the network.
Provided by the carrier, this value takes the same format as
an email address and is unique to each account.

Password [vzw]

The 1xRTT logon password is an alphanumeric value
assigned by the carrier. It could be the same for all
modems or a unique value assigned to a specific account

[< Back] [Next >] [Cancel]

- Select Automatic B option and the Next

AirLink CDMA Setup Wizard

Roaming Preference

verizon wireless

Preferred Serving System [Automatic B ▼]

Sets whether or not to allow roaming. This is important
no matter if you are using the device for Circuit-Switched
data calls or 1xRTT connections.

  -- Home Only means only registers on the Home SID
  -- Automatic will allow any Home or Roaming carrier
  -- Automatic A will start on A carriers and switch to B
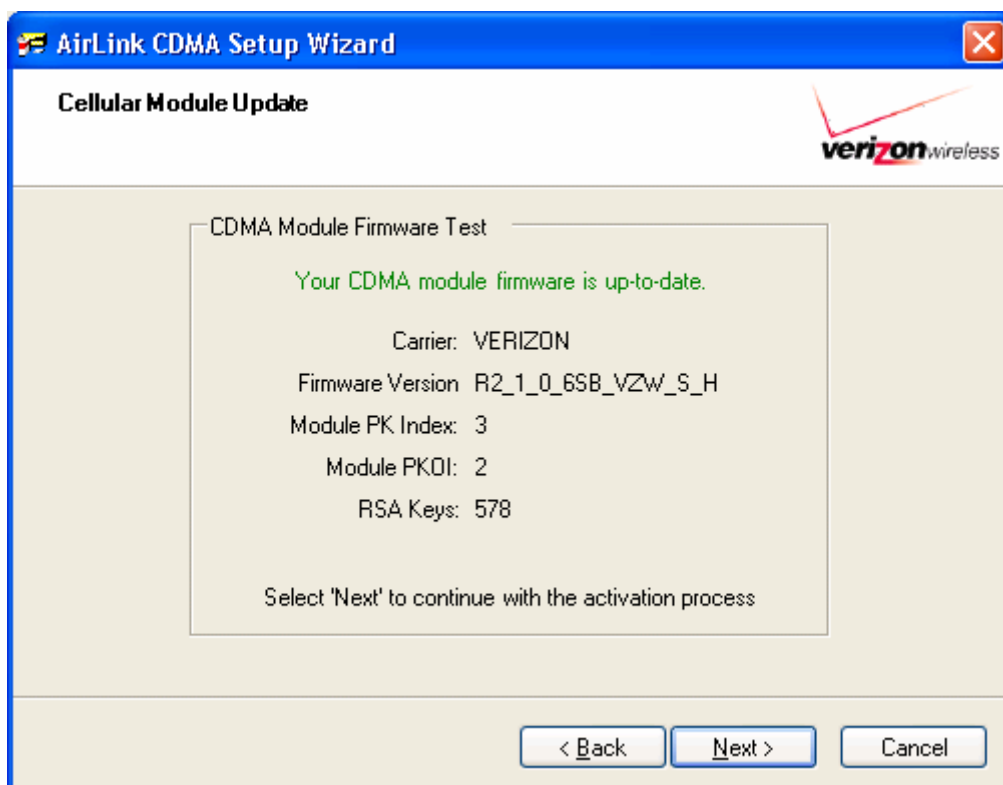 -- Automatic B will start on B carriers and switch to A

If you have questions on what roaming value to choose,
contact your carrier's sales or support representative.

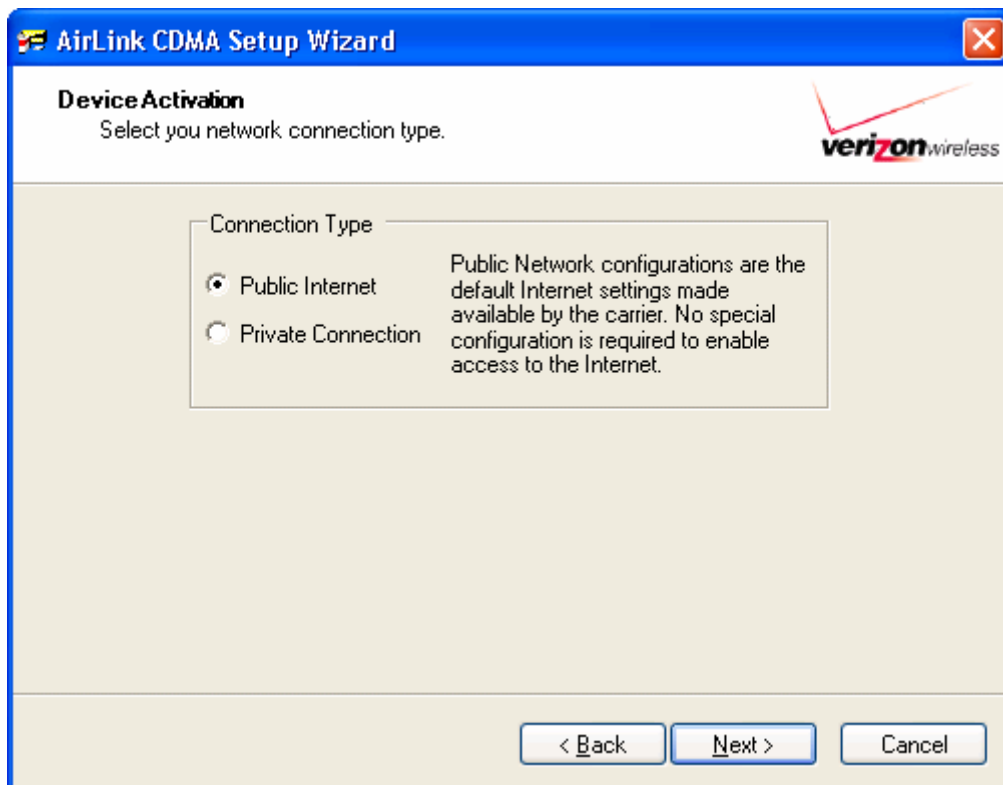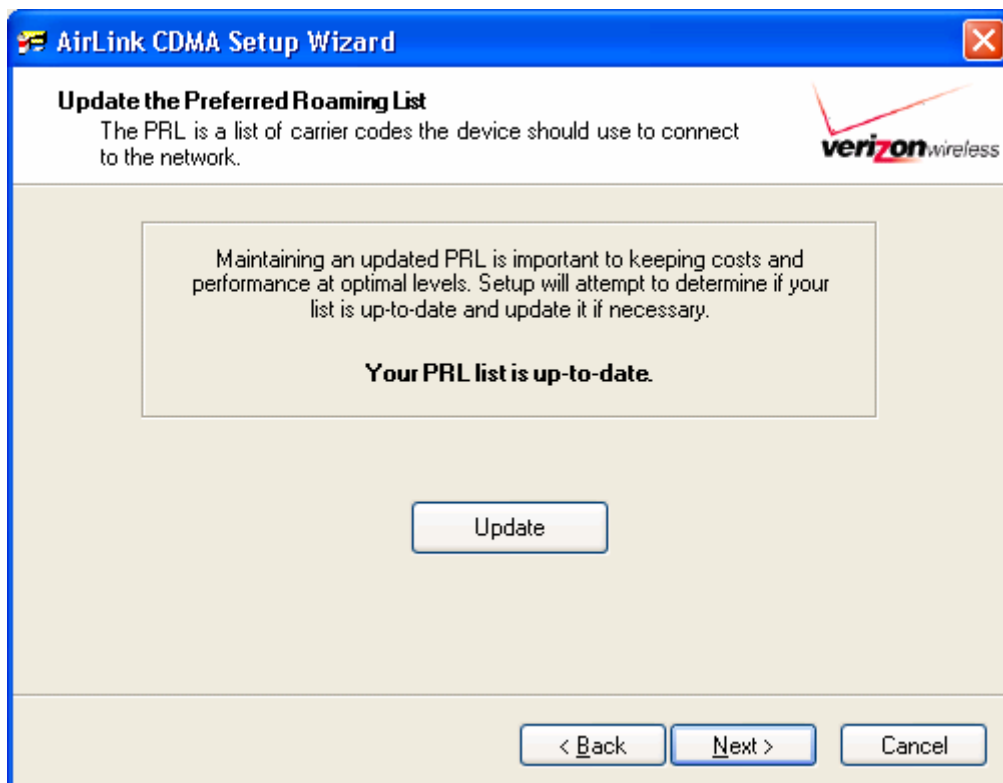[< Back] [Next >] [Cancel]

- Push the test button
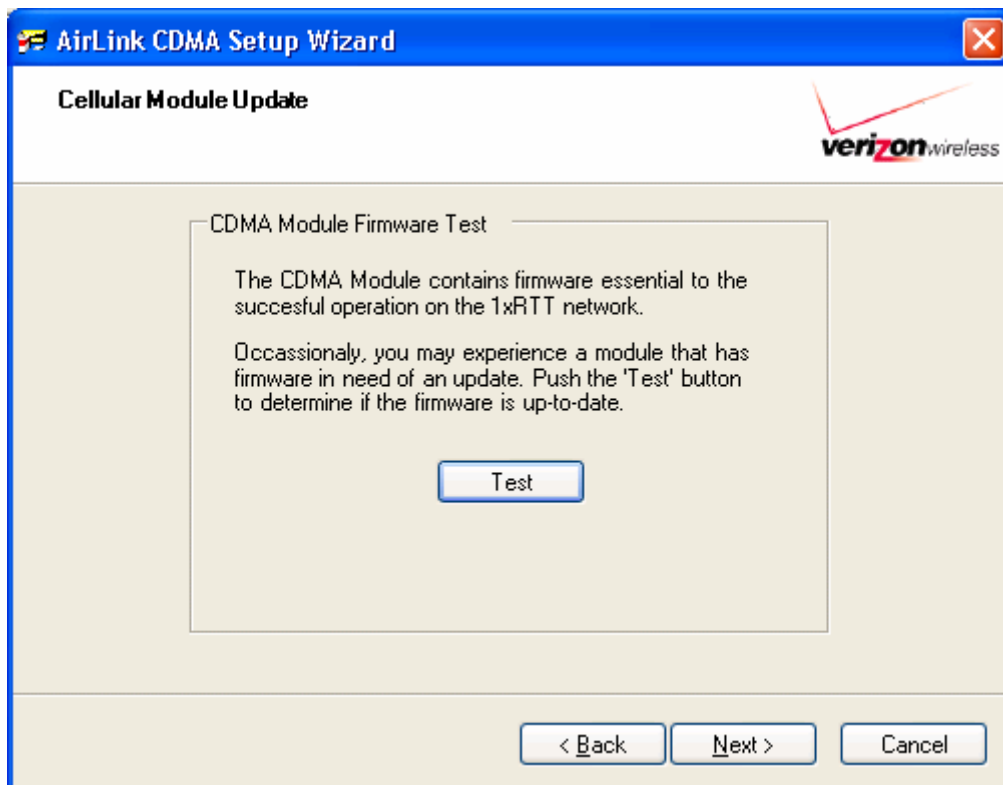
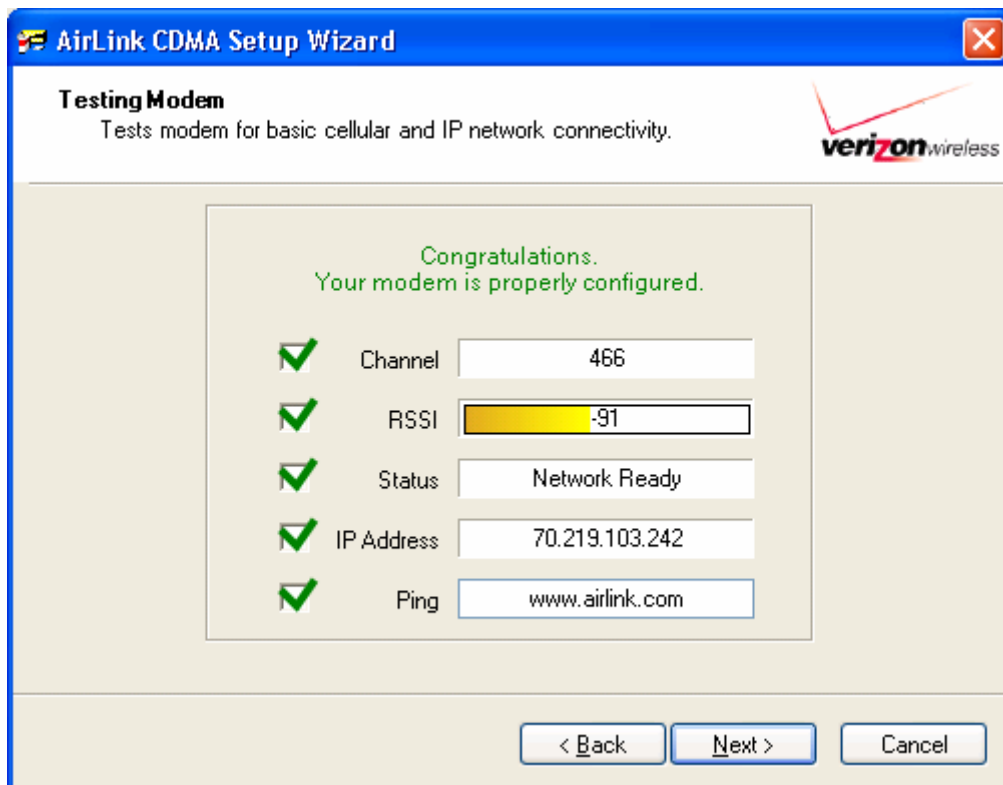- Check if the Firmware version is up to date and then Next

- Select the public internet option and then next

- Check if the PRL list is up to date , if not select update button, else next

- Check that everything is OK (you will probably have to wait few minutes) and then next

- Congratulations, your CDMA modem is activated then select finish.

GPRS Raven modem for all operators :

1) Before activating the modem you need the following items:

- 1 PC with XP or Win2K Operating System
- 1 GPRS Raven modem for G3210, its antenna and a source of power
- 1 Serial cable to connect the modem to your PC
- 1 software from Airlink Wireless Ace 3G that can be at the Airlink Web site
(http://www.airlink.com/support/modems/modem_utils.asp). If you do not have .NET installed on your PC refer to the following address http://www.airlink.com/support/dotnet.asp.
- The APN (Access Point Name),the password and the username. These parameters are given by your operator when you subscribe to GPRS. If one of this parameters is missing, you will not be able to register your GPRS modem.

2) To activate the modem follow this procedure:

- Connect the modem to the PC through the serial cable
- Connect the antenna and the power to the modem
- Install the downloaded Wireless Ace 3G software on the PC by using unzip utility
- Execute the Wireless Ace 3G software in the Windows Start Program menu and select the Connect button
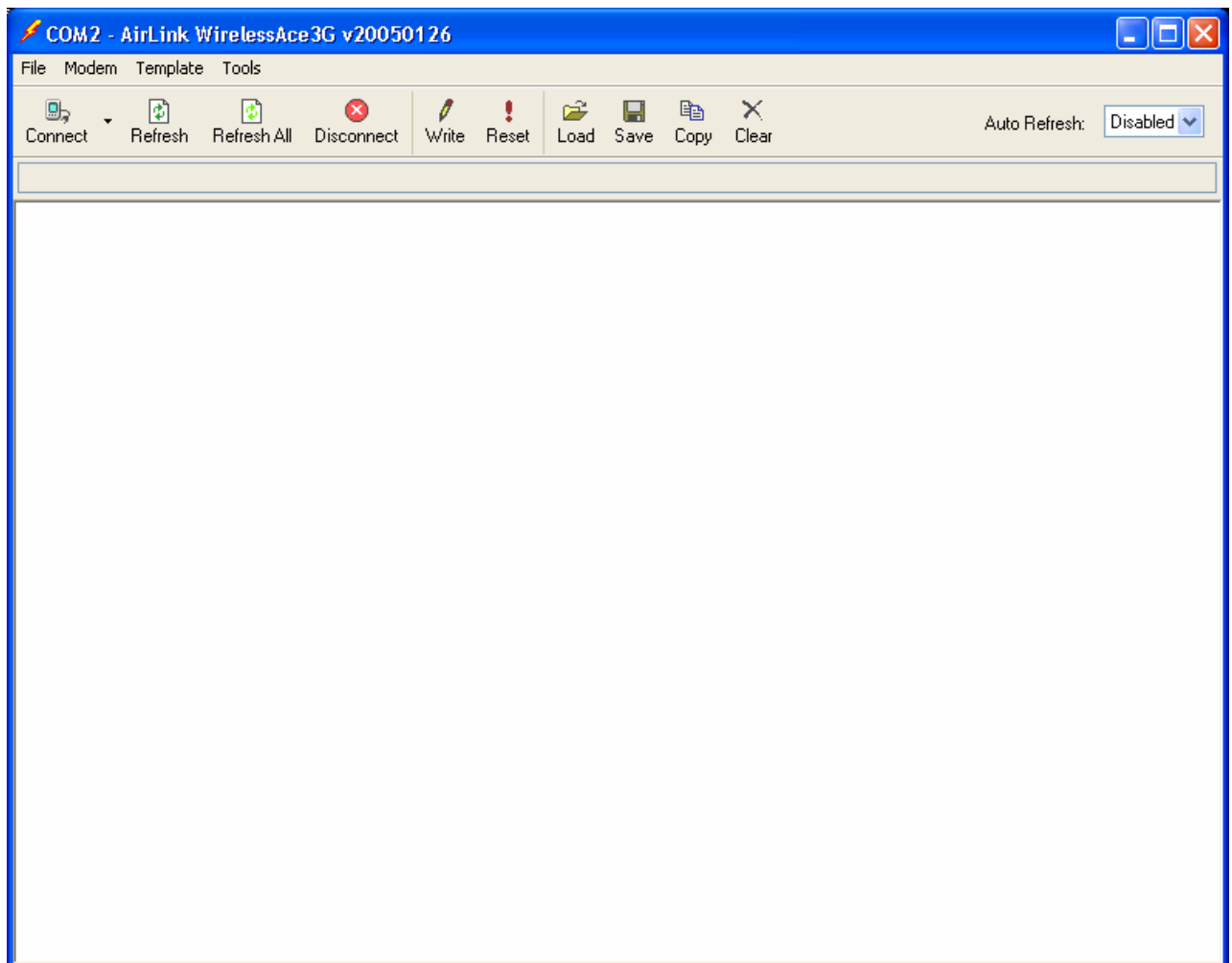
- Select PPP connection and the serial port on which the GPRS modem is connected. Fill the password with the default value (12345), and then OK

- On the left of the screen select Misc, and fill the following field :

*NETUID with the user name provided by the operator
*NETPW with the password provided by the oprator
! Be careful, respect the case !

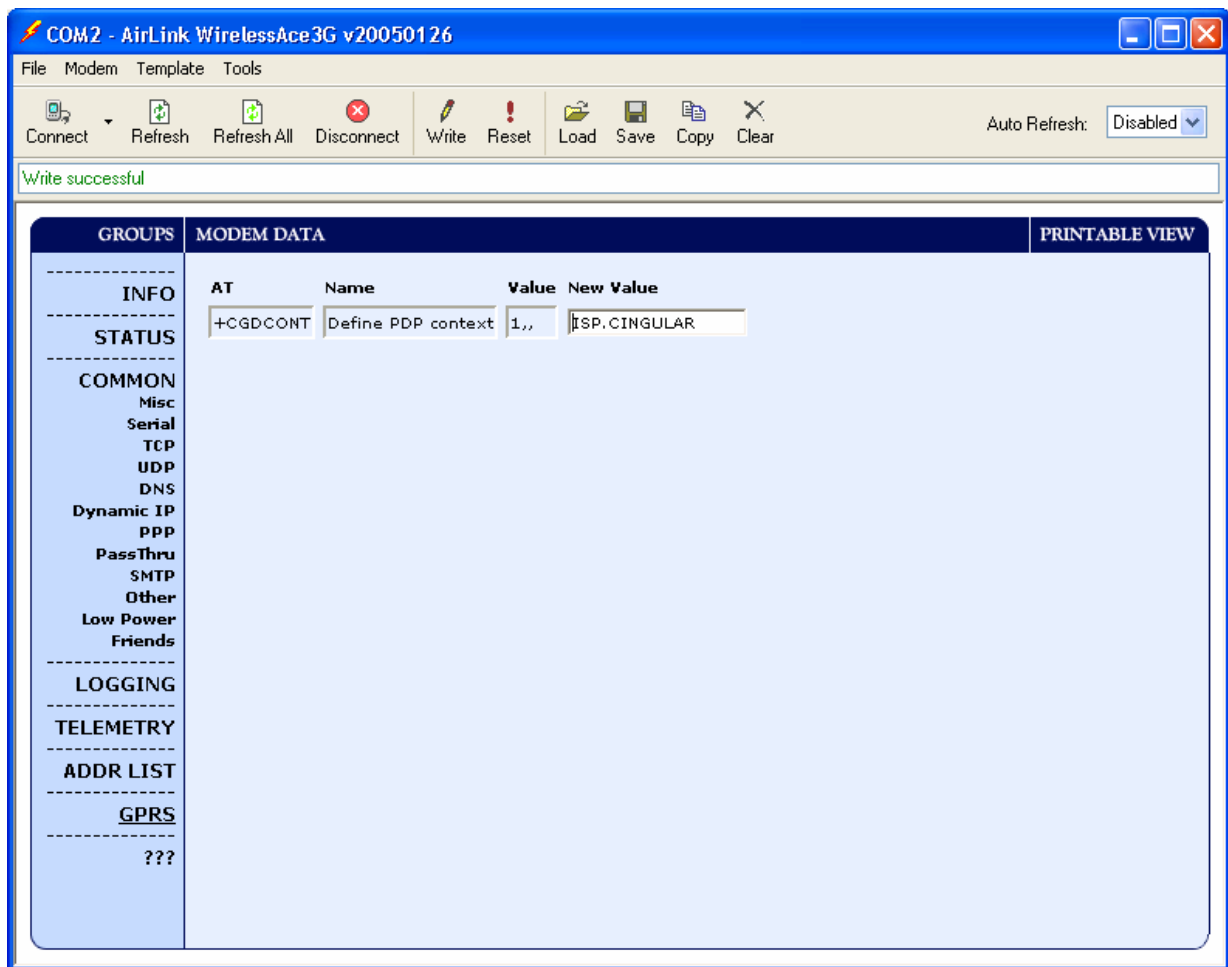then select at the left the GPRS parameter list

- Fill the field + CGDCONT, in the following form " 1,IP, APN given by the operator". **! Be careful respect the case !** and then click on the write button to record these paremeters in the modem.

- You can exit the Wireless Ace 3G utility software, and after few minutes you should check that the Reg (Registered) light on the modem is ON. Congratulations your modem is activated.