

## **AT commands in basic GSM/GPRS applications**

## CHANGE HISTORY

Rev.	Date	Author	Reason for change
A	October 7 <sup>th</sup> , 2003	Bruno LETELLIER	First document
B	August 2 <sup>nd</sup> , 2004	Bruno LETELLIER	Addition of Call Waiting, Call Hold and Multiparty call section.
C	June 2 <sup>nd</sup> , 2005	Bruno LETELLIER	SAGEM SA is replaced by SAGEM Communication. Addition of clock management, ringtones management sections. Extension of the Phonebook management section.

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## 1. SCOPE

### 1.1 INTRODUCTION.

The purpose of this document is to give examples of the use of AT commands in basic GSM/GPRS applications. These AT commands sequences can be sent from a PC to SAGEM module via the serial link, using Hyperterminal or any other terminal.

### 1.2 REFERENCE.

[1] MO110d AT commands list:

SCT TMO MOD SPEC 045 C - AT COMMAND SET FOR MO110d MODULES

[2] MO170, MO190 AT commands list:

SCT TMO MOD SPEC 001 G - Spécif AT MO170 and MO190

[3] 3GPP TS 27.005 : Use of Data Terminal Equipment - Data Circuit terminating, Equipment (DTE - DCE) interface for Short Message Service (SMS) and Cell Broadcast Service (CBS), Release 5.

[4] 3GPP TS 27.007 : AT command set for User Equipment (UE), Release 6.

## 2. VOICE CALLS

### 2.1 SINGLE CALL

```
atd123;      /* Outgoing voice call to 123
OK
ath          /* Hang up
OK

RING        /* Incoming voice call
ata
OK
ath          /* Hang up
OK

at+clip=1    /* Activation of Caller line ID presentation
OK

RING        /* Incoming voice call ...

+CLIP: "0102030405",129 /* ... with Caller ID presentation

ath          /* Hang up
OK
```

Note that according to [4] Appendix G, for an outgoing voice call,

- OK is replied directly after the ATD123 ; there is no indication of call setup.
- AT+COLP=1 makes the OK replied only when the call is setup (i.e. when the remote answers the call).

### 2.2 CALL WAITING, CALL HOLD, MULTIPARTY CALL

```
atd0102030405; /* first voice call initiated
OK

at+clcc
+CLCC: 2,0,0,0,0," 0102030405",129 /* first voice call active

OK
at+chld=2      /* put the first call on hold (necessary to dial a new outgoing call)
OK

at+clcc
+CLCC: 2,0,1,0,0," 0102030405",129 /* first voice call on hold

OK

atd0134257406; /* second voice call initiated
OK
```

```
at+clcc
+CLCC: 1,0,0,0,0,"0134257406",129 /* second voice call active
+CLCC: 2,0,1,0,0," 0102030405",129 /* first voice call on hold

OK
at+chld=3 /* activate all calls (multiparty)
OK
at+clcc
+CLCC: 1,0,0,0,1,"0134257406",129 /* second call active
+CLCC: 2,0,0,0,1," 0102030405",129 /* first call active

OK

+CCWA: ,,1 /* Call Waiting notification of incoming call (third call)
at+chld=1 /* hangs up all active calls and take third one
OK

at+clcc
+CLCC: 3,1,0,0,0 /* third call active (anonymous mode)
/* first and second calls have been ended

OK

NO CARRIER /* third call hangs up
```

## 3. SMS

### 3.1 SMS IN TEXT MODE

at+cmgf=1 /\* Set the text mode for SMS  
OK

at+cpms="ME" /\* Select the ME memory as default memory for SMS storage (SM for SIM)  
+CPMS: 0,100

OK

at+cmgs="+33612345678" /\* Send an SMS  
> Test de SMS<CTRL-Z>  
+CMGS: 107 /\* SMS has been sent with identifier 107

OK

at+cmgw="+33612345678" /\* Write and store an SMS  
> SMS stored<CTRL-Z>  
+CMGW:900 /\* SMS has been stored with identifier 900

OK

at+cmgr=900 /\* Read the SMS whose identifier is 900  
+CMGR: "STO UNSENT", "+33612345678", 18  
SMS stored

OK

at+cmss=900 /\* Send the SMS whose identifier is 900  
+CMSS: 108 /\* SMS has been sent with identifier 108

OK

at+cnmi=1,1,0,0,0 /\* Activation of incoming SMS alert  
OK

+CMTI: "ME",901 /\* SMS has been received and stored with identifier 901

at+cmgr=901 /\* Read the SMS whose identifier is 901  
+CMGR: "REC UNREAD", "+33612345678", "03/09/19,11:21:24+00", 30  
Answer to SMS stored.

OK

at+cmgr=901 /\* Read again the SMS whose identifier is 901  
+CMGR: "REC READ", "+33612345678", "03/09/19,11:21:24+00", 30  
Answer to SMS stored.

OK

at+cmgl /\* list of all SMS stored in the ME (from 900 to ...)

+CMGL: 900,"STO UNSENT","+33612345678",18  
SMS stored

+CMGL: 901,"REC READ" ,"+ 33612345678","03/09/19,11:21:24+00",30  
Answer to SMS stored.

OK

at+cmgd=900 /\* delete the SMS whose identifier is 900  
OK

at+cmgl /\* list of all SMS stored in the ME (from 900 to ...)  
+CMGL: 901,"REC READ" ,"+ 33612345678","03/09/19,11:21:24+00",30  
Answer to SMS stored.

OK

### 3.2 SMS IN PDU MODE

at+cmgf=1 /\* set the text mode for SMS  
OK

at+cmgw="+33612345678" /\* write an SMS in text mode  
> SMS test<CTRL-Z>  
+CMGW:900 /\* SMS has been stored with identifier 900

OK

at+cmgf=0 /\* set the PDU mode for SMS  
OK

at+cmgr=900 /\* read the SMS whose identifier is 900  
+CMGR: 2,23  
0001000B913306283252F600000BD4F29C0E229741D3E614

OK

at+cmgs=23 /\* send an SMS similar to the SMS stored with identifier 900 (copy and paste)  
> 0001000B913306283252F600000BD4F29C0E229741D3E614<CTRL-Z>  
+CMGS: 110 /\* SMS has been sent with identifier 110

OK

## 4. DATA CONNECTION

### 4.1 DATA CONNECTION IN CSD MODE

*/\* Recommended baudrate on the serial link is 115200 bps (set on the PC side) \*/*

at+jpr=0 */\* Recommended baudrate on the serial link is autobaud (set on the module side) \*/*  
OK

at&k3 */\* Material Flow control activation \*/*  
OK

at+cbst=7,0,1 */\* Recommended settings on the radio link : 9600 bps radio, secure mode \*/*  
OK

atd0860922000 */\* Outgoing data call to 0860922000*  
CONNECT 9600  
~ }#À!}!" }8}"& } } } }#}\$À#}%&4îàá}" }{"ÌT~ ~ }#À!}!"#} }8}"& } } } }#}  
\$À#}%&4îàá}" }{"}%ÿ~ +++ */\* DTR drop to hang up \*/*  
OK

ath */\* Hang up the data call*  
OK

Note that +++ is a command to escape from the data mode and go back to the command mode. ATO can bring you from the command mode back to the data mode.

### 4.2 INTERNET CONNECTION IN GPRS MODE

at+cgatt? */\* check if the module is attached to GPRS*  
+CGATT:0  
OK

at+cgatt=1 */\* start GPRS attachment procedure*  
OK

at+cgatt? */\* check if the module is attached to GPRS*  
+CGATT:1  
OK

at+cgdcont=1,"IP","APN",0,0,0 */\* define the PDP context (APN is a carrier setting)*  
OK

*/\* at+cgreq et at+cgqmin if QoS needs to be detailed \*/*

atd\*99\*\*\*1# */\* initiate the GPRS connection (open the PDP context)*  
CONNECT

```
~ }#Ä!}!} } }2;!}$%Ü}"&} }*} } }#}$Ä#kZ~ +++ /* DTR drop to hang up */  
OK
```

```
ath /* terminate the GPRS connection (close the PDP context)  
OK
```

Note that +++ is a command to escape from the data mode and go back to the command mode. ATO can bring you from the command mode back to the data mode.

## 5. MISCELLANEOUS

### 5.1 RECEIVE AND SEND A FAX

Due to the complex interaction between protocol and data in the fax application, it is recommended to use a third party software in order to send and receive fax.

### 5.2 PHONEBOOK MANAGEMENT

```
at+cmee=1          /* activate the extended error codes
OK

at+cpbs?          /* check the phonebook currently selected
+CPBS: "ME",0,300

OK
at+cpbs="SM"      /* select the phonebook of the SIM
OK

at+cpbr=?        /* ask for the valid index of the records in the memory
+CPBR: (1-80),20,14 /* records may be stored in position 1 to 80.

OK
at+cpbr=1        /* read the phone number recorded in position 1.
+CPBR: 1,"0123456789",129,"Daddy"

OK
at+cpbs="ME"     /* select the phonebook of the module
OK
at+cpbr=?        /* ask for the valid index of the records in the memory
+CPBR: (300-599),20,16 /* records may be stored in position 300 to 599

OK

at+cpbr=300     /* read the phone number recorded in position 300.
+CPBR: 1,"+1234567890",145,"Mummy"

OK

at+cpbs="ON"     /* select the fields of the phonebook where to store your Own Numbers
OK
at+cpbr=?        /* ask for the valid index of the records in the memory
+CPBR: (256-258),20,14 /* records may be stored in position 256 to 258

OK
at+cpbs="DC"     /* select the fields of the phonebook where the last missed/dialled/received calls
are recorded.

OK
at+cpbr=?        /* ask for the valid index of the records in the memory
```

+CPBR: (1-20),60,24 /\* records may be stored in position 1 to 20

OK

at+cpbr=1 /\* check the last number missed/dialled/received

+CME ERROR: 22 /\* the last number was hidden (anonymous)

at+cpbr=2 /\* check the last but one number missed/dialled/received

+CPBR: 2,"0246813579",129,"Eva" /\* It was a call from/to the number 0246813579. This number is recorded in the phonebook with the name « Eva ».

OK

at+cpbr=3 /\* check the last but two number missed/dialled/received

+CPBR: 3,"+1256903478",145," " /\* It was a call from/to the number +1256903478. This number was not recorded in the phonebook.

OK

at+cpbs="MT" /\* Select the joint phonebook of the SIM and the module

OK

at+cpbr=?

+CPBR: (1-80),20,14

+CPBR: (300-599),20,16

OK

at+cpbf="Mummy" /\* Look for the entry « Mummy » in the phonebook

+CPBF: 1, "+1234567890",145,"Mummy"

OK

at+cpbf="Daddy" /\* Look for the entry « Daddy » in the phonebook

+CPBF: 300,"0123456789",145,"Daddy"

OK

at+cpbf="Britney" /\* Look for the entry « Britney » in the phonebook

+CME ERROR: 22 /\* There is no record called « Britney » in the phonebook.

### 5.3 REAL TIME CLOCK MANAGEMENT

at+cclk="05/05/19,15:36:00" /\* to setup the real time clock

OK

at+cclk? /\* to check the current time

+CCLK: "05/05/19,15:36:05+00"

OK

at+cclk?

+CCLK: "05/05/19,15:37:03+00"

OK

at+cclk?

+CCLK: "05/05/19,15:37:12+00"

OK

## 5.4 RINGTONES MANAGEMENT

at+crmp=? /\* List all the ringtones available in the module  
+CRMP: (0-5),(1-5),(0),(65512,65511,65510,65498,65480,65488,65526,65493,65527,65507,65481,65506,65487,65509,65505,65504,65482,65497,65483,65503,65502,65530,65500,65531,65492,65528,65491,65501,65508,65499,65495,65529,65490,65496,65494, 65489,65485,65513,65532,65486)

OK

at+crmp=0,5,0,65510 /\* listen to the ringtone 65510 with volume 5  
OK

at+crmc? /\* check what are the selected ringtones for  
+CRMC: 65532,2,0 /\* incoming calls

+CRMC: 65532,2,1 /\* incoming fax

+CRMC: 65532,2,2 /\* incoming SMS

+CRMC: 65532,2,3 /\* Alarm

+CRMC: 65532,2,4 /\* incoming SMS CB

+CRMC: 65532,2,5 /\* incoming MMS

OK

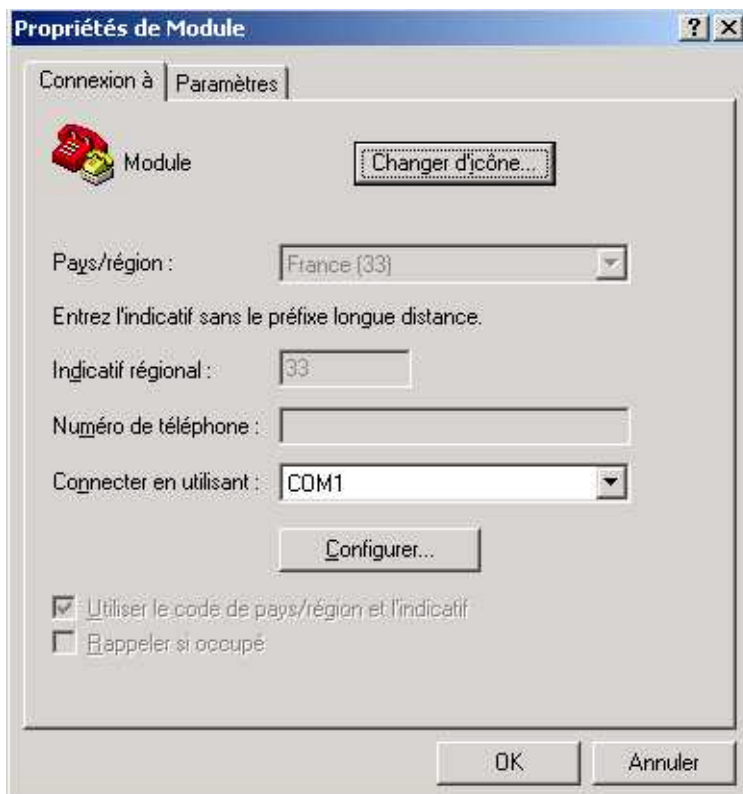
at+crmc=?  
+CRMC:  
(65512,65511,65510,65498,65480,65488,65526,65493,65484,65527,65507,65481,65506,65487,65509,65505,65504,65482,65497,65483,65503,65502,65530,65500,65531,65492,65528,65491,65501,65508,65499,65495,65529,65490,65496,65494,65489,65485,65513,65532,65486),(1-5),(0-5)

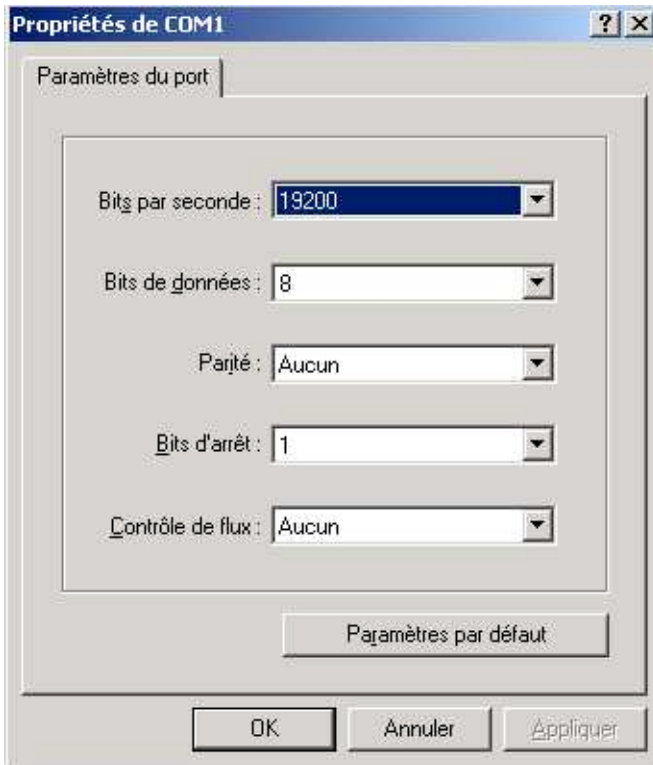
OK

at+crmc=65510,5,0 /\* define the melody 65510 as default melody for incoming calls  
OK

## 6. APPENDIX A : HOW TO SETUP HYPERTERMINAL FOR AT COMMANDS

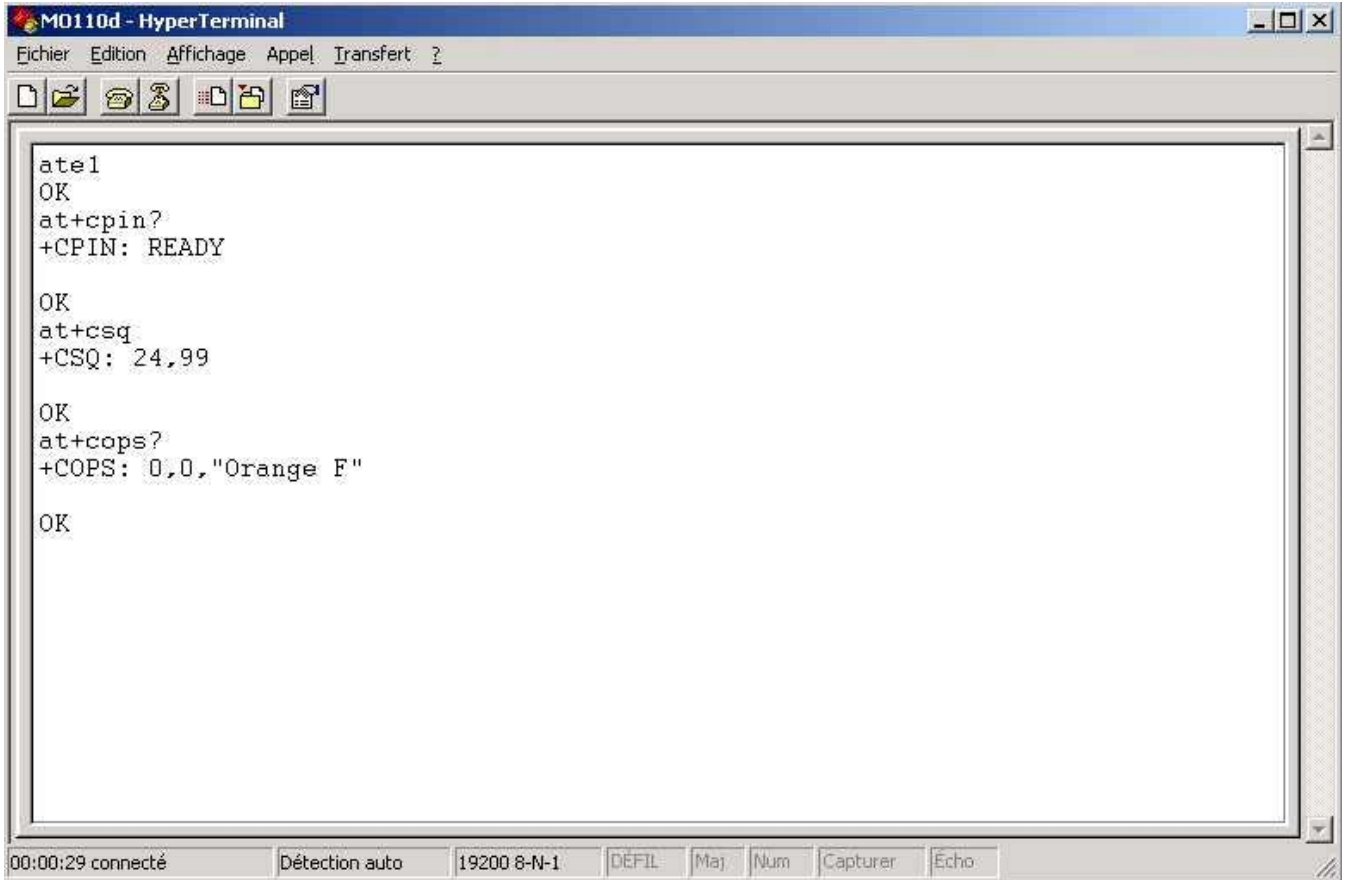
- 1) Place the module on the demo board
- 2) Power supply should be 3.9V
- 3) Connect the demo board on the COM1 port of the PC via data cable
- 4) Run hyperterminal with following settings





5) Push the "init" button of the board to initialize the module

6) Type AT commands on the keyboard



```
MO110d - HyperTerminal
Fichier Edition Affichage Appel Transfert ?
at+cpin?
+CPIN: READY
OK
at+csq
+CSQ: 24,99
OK
at+cops?
+COPS: 0,0,"Orange F"
OK
00:00:29 connecté  Détection auto  19200 8-N-1  DÉFIL  Maj  Num  Capturer  Écho
```

PS : Default speeds of the modules on the serial link are

- MO110d : 19200 bauds.
- MO170 / MO190 : Autobaud, up to 115200 bauds.

Therefore, it is recommended to setup the hyperterminal connection speed to 19200 bauds for a MO110d and to 115200 bauds for a MO170 or MO190. In case of connection failure, try every speed one after the other (2400, 4800, 9600, 19200, 38400, 57600 and 115200) as the speed might have been changed on the module during a previous use.

## 7. APPENDIX B : HOW TO SETUP A GPRS INTERNET CONNECTION WITH A PC

The document describes how to setup a GPRS connection with Microsoft Windows® operating systems (for PC) and SAGEM modules and modems.

In order to access to the GPRS network you need:

- SAGEM modules or modems
- SAGEM demoboard for modules or modem
- GPRS Network provider settings (contact your network provider)

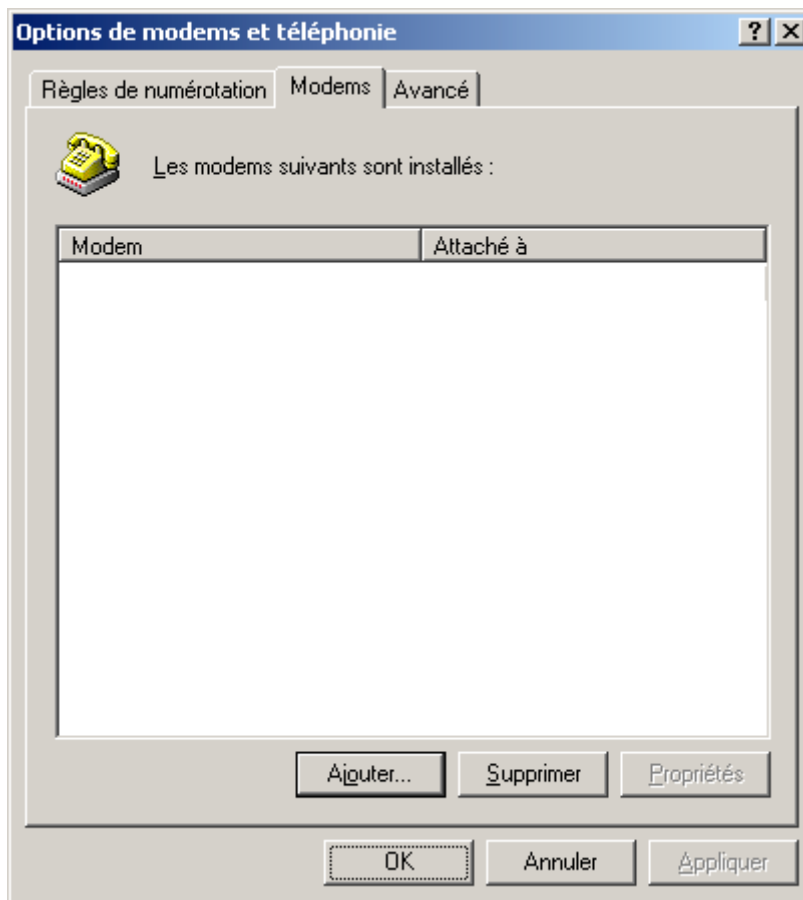
### 7.1 Configuring a SAGEM modem

#### 7.1.1 Install a new modem

Install a new standard modem from the control panel:

START → PROPERTIES → CONTROL PANEL → MODEM

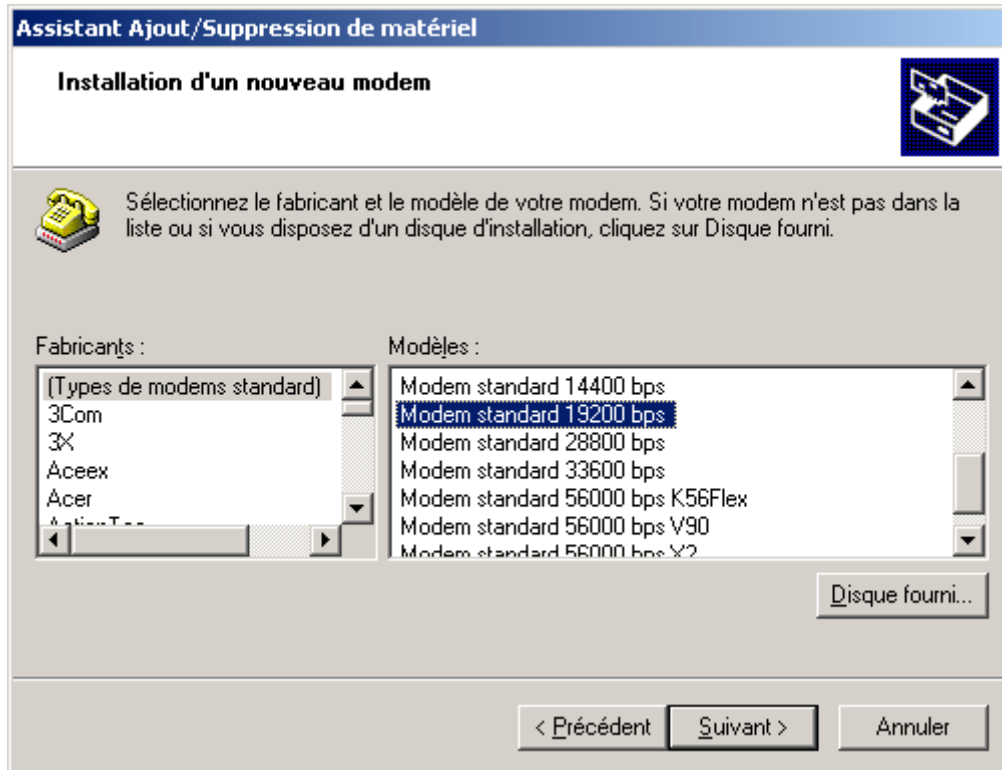
- Click ADD (new modem)



- Follow the instructions, NEXT

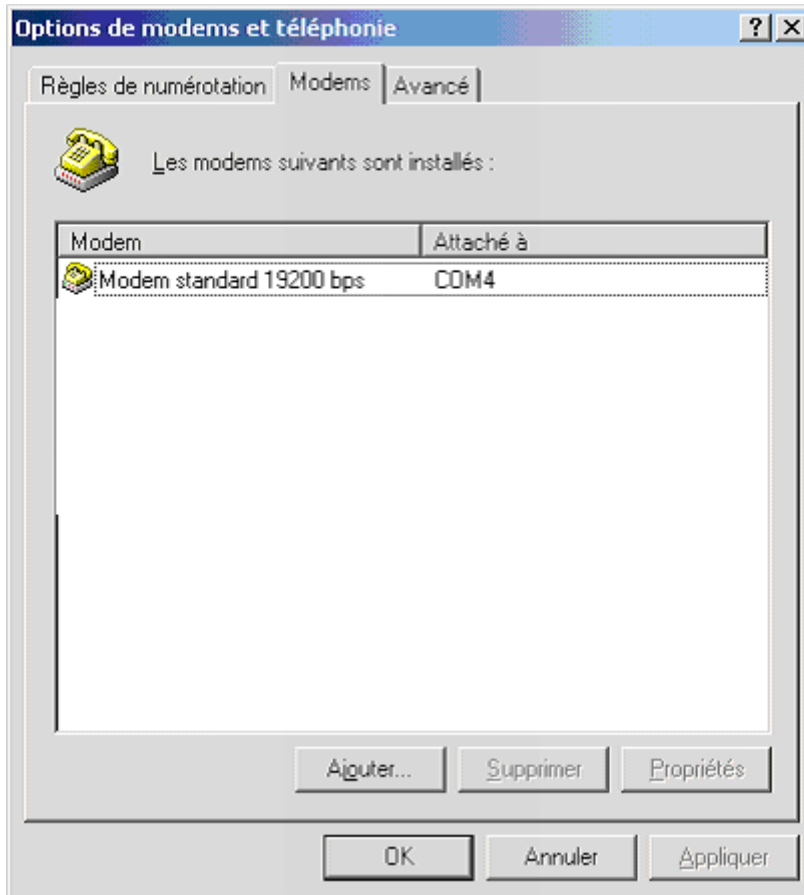


- Click ADD a Standard 19200bps Modem then click NEXT
- Install the Modem for all the Port, click NEXT then FINISHED



### 7.1.2 Configure the modem

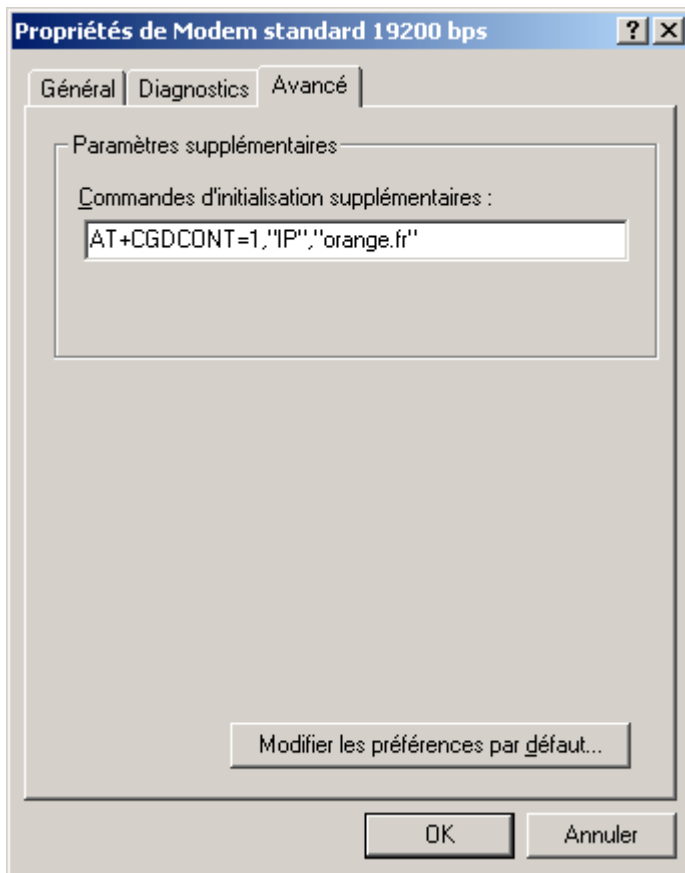
- Click on the modem icon, in order to access to the settings
- Check that the maximum speed is 115200



The extra settings can define a PDP context with the following parameters:

- CID
- PDP type
- APN
- QOS

An example of extra settings for the French network provider Orange is (pay attention to the upper and lower case) where CID = 1, PDP type = IP, and APN = orange.fr:  
**AT+CGDCONT=1,"IP","orange.fr"**



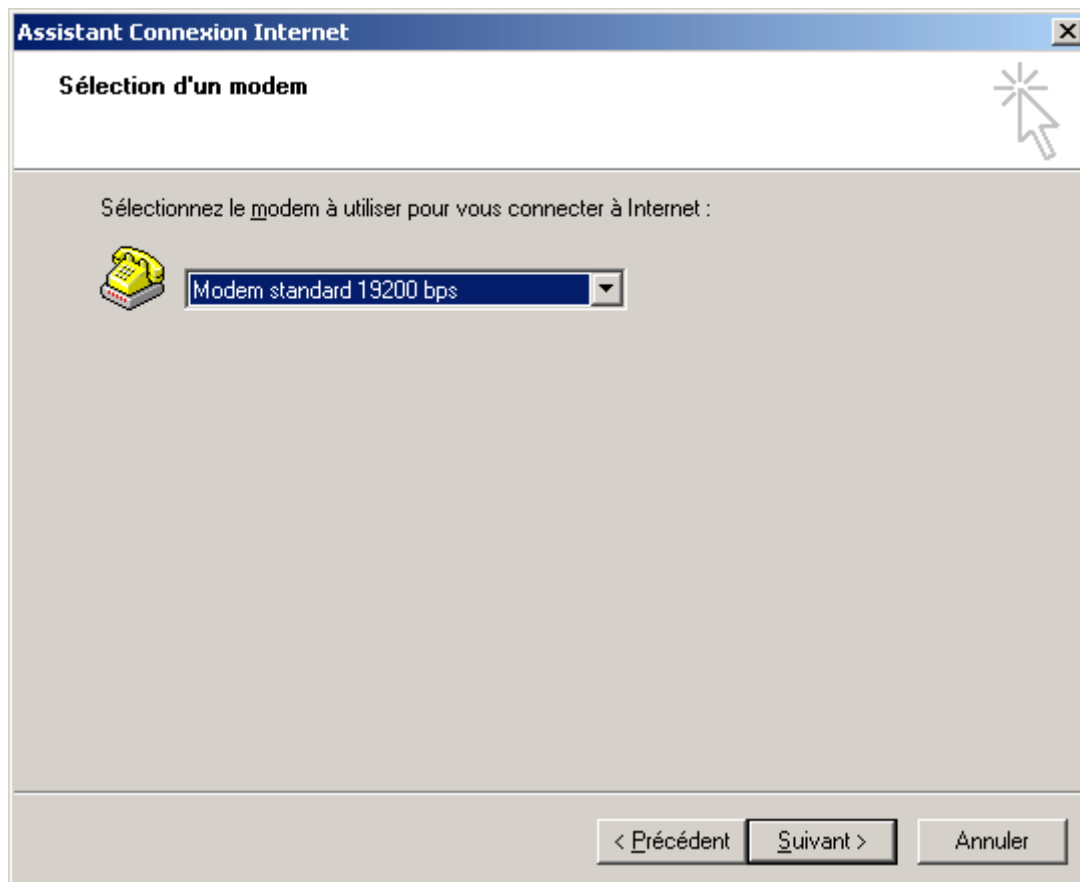
## 7.2 Configuring a new dial-up connection

### 7.2.1 Create a new connection

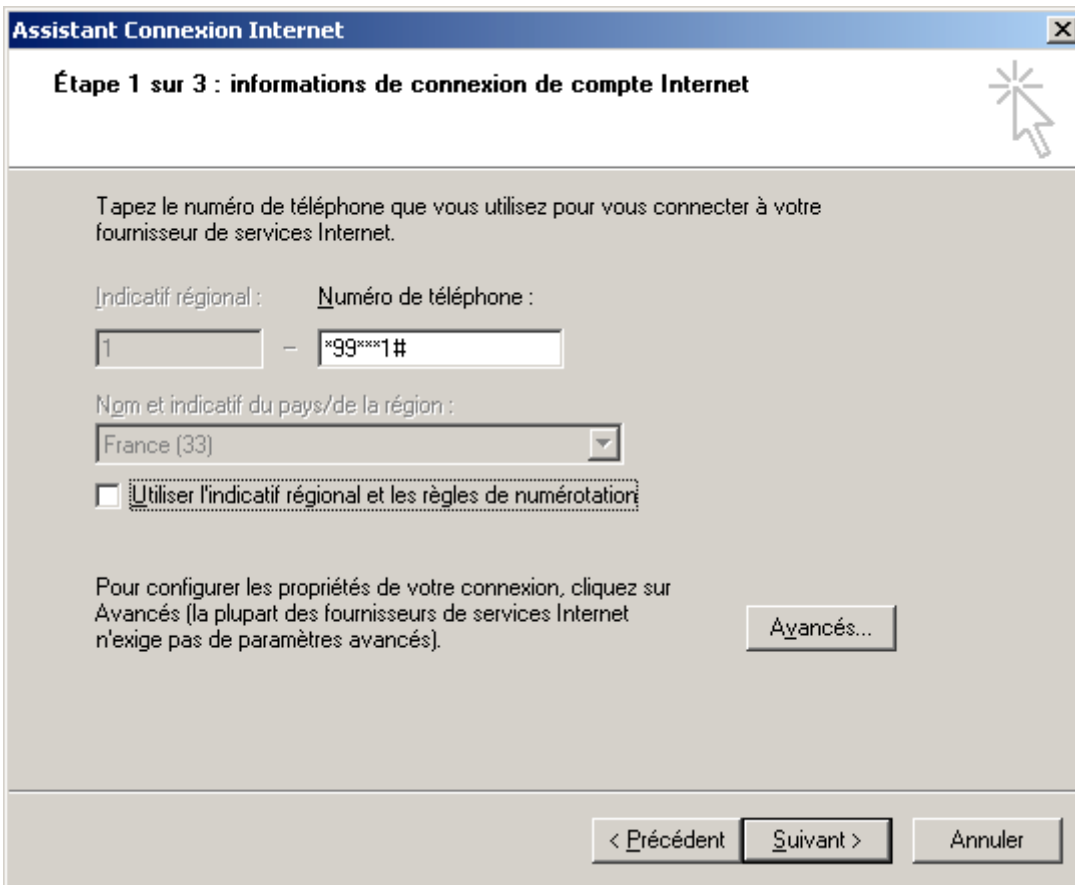
Create a new connection from the control panel:

START → PROPERTIES → CONTROL PANEL → REMOTE ACCESS SERVICE

- Click ADD a new connection, follow the instructions and check the following settings:
  - Type of connection i= Internet
  - Connection = Modem
  - Modem = Standard 19200bps Modem
- Click NEXT



- Do not SELECT "Use Telephony Dialing Patterns"
- Enter the dial-up number \*99\*\*\*1#



**Assistant Connexion Internet**

**Étape 1 sur 3 : informations de connexion de compte Internet**

Tapez le numéro de téléphone que vous utilisez pour vous connecter à votre fournisseur de services Internet.

Indicatif régional :    Numéro de téléphone :

1    -    \*99\*\*\*1#

Nom et indicatif du pays/de la région :

France (33)

Utiliser l'indicatif régional et les règles de numérotation

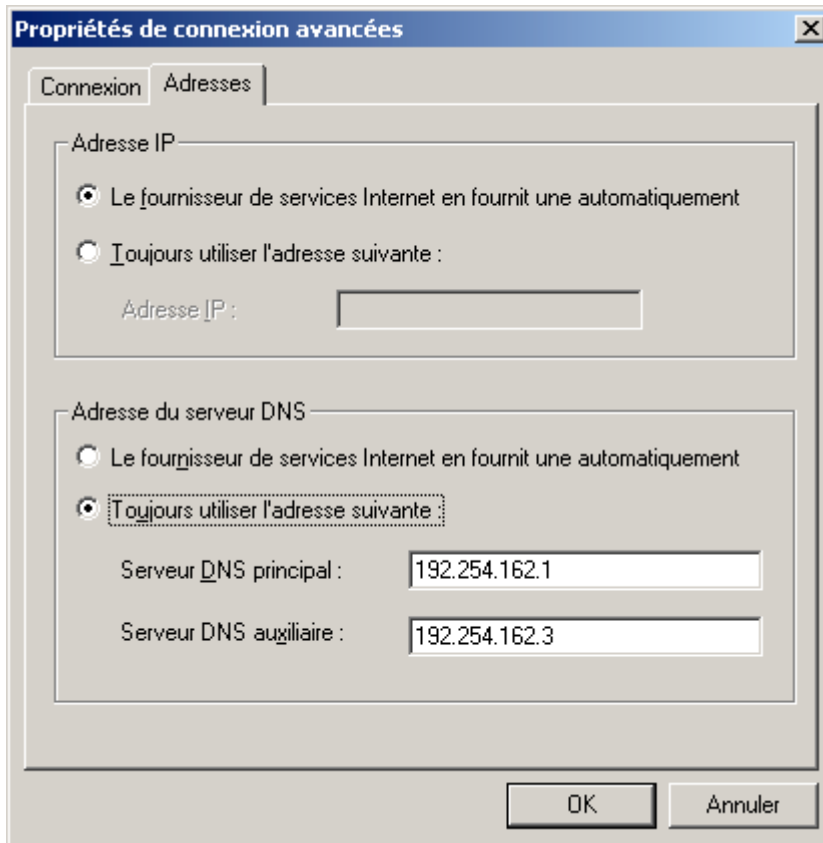
Pour configurer les propriétés de votre connexion, cliquez sur **Avancés** (la plupart des fournisseurs de services Internet n'exige pas de paramètres avancés).

Avancés...

< Précédent    Suivant >    Annuler

- Click **ADVANCED** to configure your PPP connection
- Choose "Server assigned IP address"
- Enter the "DNS server address" used by your provider, if need be (depending of the settings of your network provider).

Note: IP header compression should be disabled (depending of the settings of your network provider).



## 7.2.2 Launch the connection

If needed, User name and password must be requested to the network provider.