

GSM Socket Modem

AL7024S GPRS Quick Start Manual

Released 14. Dezember 2007



Information provided by xmodus swiss GmbH is believed to be accurate and reliable. However, no responsibility is assumed by xmodus swiss for its use, nor any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent rights of xmodus swiss other than for circuitry embodied in xmodus products. Xmodus swiss reserves the right to change circuitry at any time without notice. This document is subject to change without notice.

Product names or services listed in this publication are for identification purposes only, and may be trademarks or registered trademarks of their respective companies. All other marks mentioned herein are the property of their respective owners.

© 2007 xmodus swiss GmbH
Printed in Switzerland
All Rights Reserved

Table of Contents

1. Most useful AT-Commands	4
1.1 GPRS and TCP/IP - Commands.....	4
2. GPRS Quick start guide	6
2.1 Introduction	6
2.2 Getting attached.....	6
2.3 Defining a PDP (Packet Data Protocol) context.....	7
2.4 Defining a Quality of Service (QoS) profile (not mandatory)	7
2.5 Activating a session w/o transferring data.....	8
3. Windows-settings	9
3.1 Configuring the PC for Internet via GPRS (Win2000/XP)	9
3.2 Configuring the PC for Internet via GPRS (Win98)	10
3.3 Activating your dialup connection.....	11
4. GPRS Troubleshooting	12
5. Remarks on PDP context	13

1. Most useful AT-Commands

We have selected for you the most useful AT-Commands. They are taken from the “*Developer’s Guide/ Motorola G24 AT Commands*”, which will serve you as a manual. The selection is not complete, but it gives you an easier startup with the AL7024S socket modem.

The page references refer to the “*Developer’s Guide*” edition July 2006.

1.1 GPRS and TCP/IP - Commands

(see Chapter 3 of this guide for details)

1.1.1 GPRS

Commands	AT Manual pages	Function
AT+CGCLASS	GPRS mobile station class, p.297	
AT+CGDCONT	Define PDP Context, p.299	Define PDP context. Example: AT+CGDCONT=2,"IP","gprs.swisscom.ch" (context 2, apn is 'gprs.swisscom.ch', provided by network operator.)
AT+CGATT	GPRS attach or detach, p.306	Attach or detach from GPRS AT+CGATT=1 :attach to GPRS AT+CGATT=0 :detach from GPRS
AT+CGREG	GPRS network registration status, p.189	Command similar to 'AT+CREG'. It can be seen the GPRS-network-status of the modem.
AT+CGQREQ	Quality of service profile, (requested), p.304	Set up the quality of service profile. See chapter 3 “GPRS quick start guide”
AT+CGQMIN	Quality of service profile, (Minimum acceptable), p.302	Set up the minimum quality of service profile. See chapter 3 “GPRS quick start guide”
AT+CGACT	PDP context activate or deactivate, p.311	Activate or deactivate context. AT+CGACT=<state>,<contextnr.> <state>: 0 for deactivate 1 for activate
AT+CGPRS	Check GPRS Coverage, p.310	

1.1.2 TCP/IP

Caution: do not mix these commands for TCP/IP with the above mentioned GPRS Commands

Commands	AT Manual pages	Function
AT+MIPCALL	Create Wireless Link p. 356	Sets up PPP connection to GPRS Node and returns to DTE the dynamic IP of G20. Parameters: see explanations about GPRS
AT+MIOPEN	Open Socket, p. 358	Up to 4 Sockets can be opened. Parameters: Socket-nr., Source-Port, Dest.-IP, Dest-Port, Protocol
AT+MIPSEND	Send Data, p. 363	Sends data to the Socket
AT+MIPSETS	Size for Auto-Push, p. 361	Sets mark in accumulating buffer. When mark is reached, data is pushed from buffer to protocol-stack. To force push, see next command.
AT+MIPPUSH	Push Data into Protocol-Stack, p. 364	Causes g20 to push data from buffer to protocol-stack. (Parameter is Stack-Nr.)
AT+MIPCLOSE	Close Socket, p. 360	Closes Socket. Data in buffer will be lost.

2. GPRS Quick start guide

2.1 Introduction

This brief guide aims at explaining the basic steps for getting started with GPRS. It supposes you are a bit familiar with GPRS concepts, like network attachment, session or PDP context.

This guide is not intended to give full details about how GPRS works, all GPRS-specific AT commands (check out "*Developer's Guide*."

It's worth pointing out that **GPRS is IP-centric**. It means that it does not provide a "transparent" link between the MS and the network. This clearly contrasts with CSD (Circuit Switched Data, or data calls in GSM mode) which provides a transparent link (in which data can be of whatever protocol, format, structure etc the user wants).

So, in a nutshell, using GPRS implies that IP packets be exchanged between MS the and the network. In the case a PC is hooked to the MS, it also implies that IP packets be exchanged between the PC and the MS. That's why the GPRS link is not considered as a transparent link since the MS only expects IP packets from the PC, and no longer unstructured plain data.

Going on further, it's not possible to carry plain IP packets over a serial link due to loss of packet boundaries since serial links are not packet-oriented. So to overcome this and to manage the IP configuration, a low level protocol named PPP is used. This protocol embeds IP packets into PPP frames which then are sent over the serial link. On M\$ Windows, **PPP** is basically referred to as a dial-up connection which is configured as follows.

2.2 Getting attached

The user can check whether the MS is GPRS attached by entering:

AT+CGREG?

which is the counter-part command of AT+CREG? (GSM attachment status).

The response **+CGREG:0,1** means the MS is successfully attached.

The response **+CGREG:0,0** means the MS is trying to attach.

The response **+CGREG:0,2** has failed to attach and stopped trying to attach.

Alternatively, the registration status can be retrieved using:

AT+CGATT?

The response **+CGATT:1** means the MS is successfully attached.

Whereas response **+CGATT:0** means the MS is not attached, or has failed to attach.

This command is somewhat less accurate than **AT+CGREG?**.

When attached to GPRS, the GPRS LED is on.

To check if network has GPRS-coverage, you can use the command **AT+CGPRS**.

The AL7020S Socket-Modem does not require the AT+CGATT command, as it attaches to GPRS after entering the PDP-context command (see next section).

2.3 Defining a PDP (Packet Data Protocol) context

Before setting up a session, a PDP context has to be defined.

The following command is used for that purpose:

AT+CGDCONT=1,"IP","apn"

whereby "**apn**" (**access point name**) is a string parameter supplied by the GPRS operator and specifies the gateway to be used between the GPRS network and the internet realm. (**the apn is case-sensitive**).

If no APN is provided, simply type in:

AT+CGDCONT=1,"IP"

"IP" means that all data exchanged between the MS and the network are IP packets.

Other optional parameters are not relevant for the time being.

This command has to be sent to the Socket-Modem after every power-up and before any GPRS-Connection is made.

Therefore it should also be entered in the Modem-Options of the control-panel, if you drive the Modem with a Windows-Application. (See following chapter for GPRS-Configuration of Windows.)

2.4 Defining a Quality of Service (QoS) profile (not mandatory)

The QoS consists of a set of 5 parameters (precedence, delay, reliability, peak throughput, mean throughput) which allow the user to reach a trade-off between contradictory features. For instance, depending on the application the user can favor a better reliability at the expense of the throughput.

For the moment, the QoS is usually ignored by the network, which provides a best-effort service.

To choose the right parameters for this command, look at the "*Developer's guide*"

If you don't want to bother about the parameters, you can enter the command as follows:

AT+CGQREQ=1,0,0,3,0,0 or alternatively **AT+CGQREQ=1,0,0,0,0,0** .

AT+CGQREQ=1,0,0,3,0,0

The first “1” is the number of the PDP context for which the QoS is to be defined. “0” means the corresponding parameter will be set by the network upon session activation. “3” sets the reliability to LLC unacked and RLC acked.

At this point, you could enter the command **AT+CGQMIN**, which defines the minimum acceptable quality. It uses the same parameters as AT+CGQREQ.

Both commands can be omitted in most cases.

2.5 Activating a session w/o transferring data

To activate a session, you can activate a context with the following command.

In this case, a GPRS connection is established, but not used.

AT+CGACT=1,1

Which activates the context #1

With **AT+CGACT?** you can get the activation status of all defined contexts. It should come back with:

```
+CGACT:1,1  
+CGACT:2,0  
+CGACT:3,0
```

which means context #1 is activated and contexts 2 and 3 are not.

At this stage it's not possible to transfer data because the MS is still offline.

Try deactivating the session with

AT+CGACT=0

Now AT+CGACT? should answer back:

```
+CGACT:1,0  
+CGACT:2,0  
+CGACT:3,0
```

meaning all contexts are deactivated.

3. Windows-settings

3.1 Configuring the PC for Internet via GPRS (Win2000/XP)

- a) First, make sure a modem driver is installed. You can use our modem-driver or the "standard-modem 19200". Doubleclick on "My Computer", "control panel", "Phone and Modem options" and install the modem (check the box "not recognizing automatically my modem") To install our Modem-driver, copy the .inf – File into an empty Folder and select it from the install-program.
- b) .After the installation of the modem-driver, you should go to the menu: "phone and modem options" -> "Modem" ->"properties"->"advanced" -> "extra initialisation commands" and enter the AT+CGDCONT command as defined in the previous chapter.
- c) Now configure the dial-up connection. Double-click on "My Computer", "control panel", "Network and Dial-up Connections", "Make new connection". The "Network connection wizard" opens.
- d) Click on "Next" and choose "Dial-up to the Internet", then click on "Next".
- e) Choose "I want to set up my Internet connection manually..." and click on "Next"
- f) Choose "I connect through a phone line and a modem" and click on "Next".
- g) Now you can choose a modem, select the previously installed modem-driver and click on "Next".
- h) Enter the telephone number as follows ***99***1#** / **"1" stands for the pdp context**. You can change it to another number, if you are using another context.
- i) Uncheck the box "use area code and dialing rules"
- j) Click on "advanced" and on the tab "connection"
- k) Set connection type to "PPP" and "Logon procedure" to "none".
- l) Click on tab "addresses"
- m) In the field "IP address" choose "Internet service provider automatically provides one"
- n) In the field "DNS server address" choose "always use the following" and enter the **IP addresses** that are supplied by your network provider.
- o) Click on "OK" and on "Next"
- p) Enter the **user name** and the **password**, supplied by your network provider.
- q) Click on "Next" and enter a name for the connection
- r) Click on "Next" and answer the question about an Email-account with no. Click on "Next".
- s) Uncheck the field "connect to the internet immediately" and click on "finish". The dial-up connection is now configured, but needs some little modification as follows:
- t) Right-click on the icon with the connection just configured. It is found in the folder "network and dial-up connections"
- u) In the context-menu choose "settings"
- v) On the tab "general" click on "configure". Set the max. bitrate to 115200 bits/s. Click "OK".
- w) On the tab "networking" click on "settings". Uncheck "Software compression". Click on "OK".
- x) On the tab "networking" check "TCP/IP", uncheck the other fields.
- y) Mark "TCP/IP" and click on "properties"
- z) Click on "advanced" and uncheck the field "IP header compression"
- aa) Click three times on "OK".

3.2 Configuring the PC for Internet via GPRS (Win98)

- a) Click on the "MyComputer" icon on the desktop
- b) Select "dial-up networking"
- c) Select "Make New connection"
- d) Enter the name of the connection
- e) Select a "standard 19200" modem or install our driver as explained in the "Windows 2000"-section. Configure the max speed to 115200 (after clicking the "configure" button) and the COM according to your needs. Should the standard 19200 modem not be installed, you have to install it prior moving on: select the "modems" icon from the "configuration panel", select "Add" and check the "Do not detect my modem..." item. Click on "next". Select a "Standard modem types" from the manufacturer list and then select a standard modem 19200 or higher. Click on "next". Proceed to the selection of the com-Port click on "next" and then finally click on "finish". When you're done with the installation, click the "Properties" button from the modem panel and set the speed to 115200. Click on "OK", then on "close".
- f) proceed to the next screen
- g) leave the area code field blank, do not alter the country code field and type in the telephone number field : *99***1# The "1" tells the MS to activate PDP context number 1. If you defined a context as number 2 then replace 1 with 2. Note: enter 0 in the area code if Windows complains that it is empty.
- h) Hit "Next" and "Finish".
- i) On the window displaying dialup connection icons, right-click on your brand new connection icon and select "properties".
- j) On the "General" tab, be sure to uncheck the "Use country and area code" item.
- k) On the "Server types" tab, uncheck everything except the last "TCP/IP" item.
- l) Hit "TCP/IP settings" button Activate "Server assigned IP address" Activate "Specify name server addresses" and then enter the **DNS IP addresses** supplied by the **GPRS- operator**. Uncheck "IP header compression" Be sure "Use default gateway" is checked.
- m) Press "OK" and "OK" from the main menu.
- n) You're done with your PPP connection

3.3 Activating your dialup connection

First, make sure, the serial rate of MS is set to 115200 baud. If not, access the modem with Hyperterminal and set it. (**AT+IPR=115200;&W**). You should also set the "maximum port speed" to the same speed in the Windows Modem Properties.

Close your terminal program

Double-click on your dialup connection icon. Fill the "user" and "password" fields as supplied by your GPRS operator Hit "Connect".

Normally, if everything's going smoothly the dialup window should go down to the tray bar within 2 or 3 seconds of launching.

4. GPRS Troubleshooting

Often, the cause of failure is not caused by GPRS-Problems, so check all functions without GPRS also:

Be sure that you entered the SIM-Code if required. (AT+CPIN?).
You can configure the SIM that it does not ask the PIN with AT+CLCK.

Check signal-level with AT+CSQ (should be higher than about 8-10).

Check if modem is registered to network with AT+CREG.

Eventually the list of preferred operators is empty and should be modified.
(AT+CPOL and AT+COPS commands).

Make voice connection to normal phone (ATD ... ;) or data-call to some known internet-provider.

Check if there is GPRS-coverage with AT+CGPRS and checking the LED.

Try to attach to GPRS with AT+CGATT=1 and check with AT+CGATT? and AT+CGREG.

Be sure your PDP-Context ist defined by AT+CGDCONT.
(check : AT+CGDCONT?). Also, be sure to properly enter the APN which is case sensitive.

This is really the only mandatory command needed for GPRS.

The AL7020S cannot save the setting of AT+CGDCONT , so you should assure the modem gets it every time by the terminal or by windows. (See Windows-section).

When you run GPRS from Windows-dial-up-connection, be sure the telephone-number “*99***#1” is entered, and aerea- and country-codes are disabled.
Make sure there is the correct username and password and the IP-Adress of the DNS-Server. It is also normal, that you can only access the GPRS-Gateway of your own network-provider.

If you had entered AT+CGQREQ = 1,0,0,3,0,0
then try with AT+CGQREQ=1,0,0,0,0,0 and vice-versa. Try also not to use the command at all.

5. Remarks on PDP context

The **red** marked parts of the text indicate the context-numbers.
Using the **context-number** (possible numbers 1-3) you could prepare up to three different contexts, and configure the corresponding dial-up networks on the PC. The dialed number is according to the context (eg. *99*****2** for context 2).
The **green** marked text indicates the data that is provided by the network-operator.

Here two tested configurations for Swiss network operators:

Swisscom

"apn" = **gprs.swisscom.ch**
"DNS" = **164.128.036.034**
username = **gprs**
password = **gprs**

Sunrise

"apn" = **internet**
"DNS" = **212.35.35.35**
username = **new**
password = **new**