

CardModem *GSM*

GSM USERS GUIDE

For using your modem
with a GSM mobile phone

Revision B
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Disclaimer

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Contents

General Safety	4
Introduction	5
Installation & Configuration	6
Installing Your Gold Card GSM	7
Making a Data Call Manually	8
AT Commands	9
Messages from the CardModem GSM	14
S Registers	15
Troubleshooting	17
Glossary of Terms	19
Technical Specifications	26

We recommend that you read this chapter carefully.

WARNING

Please read the following warning before installing your NetComm CardModem GSM. To prevent possible damage to the GSM from electrostatic discharge, insert the PCMCIA card into your computer **BEFORE** connecting the cellular phone cable

Conditions of Use

Do not use your GSM phone and modem, connected to the phone, when on board an aircraft (the phone may interfere with the aircraft's electronics). Current legislation forbids this use and can lead to legal proceedings against the user.

In the unlikely event of your NetComm CardModem GSM developing a fault, please do not attempt to repair it yourself.

In addition, it is essential that you refer to the GSM phone User's manual, and, to your PC User's manual for the general safety recommendations regarding the use of your phone and your PC.

Environment

Do not expose your GSM phone or NetComm CardModem GSM to unfavourable environmental conditions (rain, dust, sea air...)

The manufacturer's recommended operating temperature range for the NetComm CardModem GSM is 0°C to +55°C

The manufacturer disclaims any liability for damage which may result as a consequence of improper use contrary to the instructions contained herein.

Introduction

To use the NetComm CardModem GSM with a GSM phone, you must first purchase a “GSM Upgrade Kit” for your particular mobile phone. Contact NetComm TeleMarketing on 1800 269 950 for more information.

Welcome

Thank-you for buying a NetComm CardModem GSM. Your new card is a state-of-the-art Type II PC Card device that can be fitted in any system fitted with a Type II or Type III PC Card slot and offers GSM data communication rates of up to 9600bps as well as Group III fax send and receive facilities. In addition, the NetComm CardModem GSM is compatible with all data communication packages that support the industry standard AT command set and all fax software that supports fax modems.

When used with a computer and a compatible GSM mobile telephone, you can use your NetComm CardModem GSM to send and receive files and faxes, login to online services or access the Internet anywhere within your GSM service provider’s coverage area.

Before using your card, please take a moment to read through this manual, as doing so will help make installing and using the NetComm CardModem GSM trouble free. Users who are not familiar with the technical terms used when configuring PC Card peripherals and data communication devices will find the Glossary of Terms particularly useful.

Multi-function Card

You have purchased a multi-function PC-Card that includes GSM as well as standard modem functionality, the information contained in this manual is relevant to the Card’s operation in GSM mode only. For information on using the CardModem GSM in analogue (PSTN) mode, please refer to the “NetComm CardModem GSM - Modem Users Guide”.

In order to switch between modem operation and GSM operation, simply insert the appropriate cable (either the one designed to connect your card to a mobile phone or the one designed to connect your card directly to a standard telephone line socket) – your multi-function Card will recognise the type of cable being used and configure itself appropriately, avoiding the need for any user configuration whatsoever.

Installation & Configuration

Installation consists of attaching your NetComm CardModem GSM to your mobile telephone, inserting the card in your computer's PC Card slot and then configuring the card for use, this final step usually being performed automatically by your computer's PC Card configuration software.

The majority of notebook computers have Card & Socket Services Software pre-installed. If this is the case, you should just plug the NetComm CardModem GSM into the PC Card slot and the software will automatically configure itself.

Should you wish to use the enabler program instead of Card & Socket Services, please insert the Modem Utilities disk into your A Drive and type the following command: `A:\DRIVER` and press enter.

Inventory

Your NetComm CardModem GSM package comprises of the following:-

- The NetComm CardModem GSM itself.
- A data lead for connecting the card to a specific GSM phone range.
- Fax and communications software.
- A utility disk containing a Point Enabler and a range of application-specific drivers.
- Installation and software reference manuals.

If any items are missing, please contact your supplier.

Installing Your CardModem GSM

1. With the label uppermost, gently insert the end of the card marked INSERT into a suitable PC Card slot on your computer. Note, however, that some notebook computers are fitted with PC Card slots which require that PC Card devices be fitted with the label facing downwards. When the card is almost completely in its slot, you should feel a slight resistance. Slightly more pressure is required at this point to push the card fully into the computer but you should never force it, as the connectors are very delicate and applying too much force can cause irreparable damage.

2. Attach one end of the data cable to your mobile phone, and the other to the socket on your NetComm CardModem GSM. Consult your computer's documentation for full details on inserting and ejecting PC Cards.

Command set configuration (data communications)

Your NetComm CardModem GSM is fully Hayes AT-command set compatible, allowing most software designed for use with conventional Hayes AT-compatible modems to work with it.

Flow Control

If the option is available, you should enable **HARDWARE FLOW CONTROL** and disable **SOFTWARE FLOW CONTROL** in your software.

Using Pre-set configurations:

Some software included sets of pre-set configurations that include information on how to set the serial port speed and command set selections. If such configurations exist in your software, you can select either the entry for a **GSM DATA CARD** or one for a **Hayes 9600 modem**. If the pre-set entries only contain information about command set selections, choose any Hayes AT-compatible entry. In either case, you may still have to manually select the serial port number setting manually.

Fax Software

Your NetComm CardModem GSM supports Fax Class 1 in GSM mode. Please ensure that your fax application software is set up for Class 1 operation when using your CardModem GSM with a GSM mobile phone.

Making a Data Call Manually

In most communications packages you can dial a telephone number by simply selecting it from a user-defined 'phone book'.

However, should you want to connect to a remote service using manual commands type `ATDTnnnn` from the command terminal screen in your software, where `nnnn` is the phone number you wish to contact. When you have issued this command, the NetComm CardModem GSM automatically dials the number specified via your GSM phone. When you have completed your call, you can manually hang up and disconnect by typing `+++` and then `ATH`.

See your communications package's documentation for more details on how to use its phone book or terminal screen.

This section is designed for advanced users who wish to use AT Commands. Normally, these commands are automatically issued by the communications software that you use.

There are two modes of NetComm CardModem GSM operation; Command mode and Data mode. In Command mode, AT commands control the NetComm CardModem GSM configuration and general operation e.g. sets baud rates, dials numbers etc. In Data mode the NetComm CardModem GSM sends and receives files, or sends data entered directly from the keyboard.

Command Syntax

All the 'AT' commands are preceded with the ASCII characters AT (Attention Code) and terminated with a Carriage Return. Prior to terminating the command line, you can edit mistakes by using the Backspace key. This will delete the last character entered, but it will not delete the AT at the beginning of the line.

Your NetComm CardModem GSM supports some AT commands for software compatibility only. These commands will not have any affect on the GSM PC Card's functionality:-

AT L, M, N, Y, &Q, &T, \K, %C, %E

The AT command can be issued using either upper or lower case characters, but not a combination of the two. You are allowed to enter more than one command on a line between the AT and the Carriage Return. Spaces are ignored.

There are two commands that do not obey this rule: the A/ command and the +++ command:-

A/ Causes the CardModem GSM to re-execute the last command line.

Note that it is not followed by a Carriage Return.

+++ Causes the NetComm CardModem GSM to exit from data mode and enter command mode – the call is not automatically disconnected.

Any AT commands that are not applicable to GSM mode of operation are ignored. This means that standard 'Hayes' drivers can be selected when installing software. All command lines must begin with the AT character pair. Typing AT on its own will result in the OK message being returned by the NetComm CardModem GSM.

● **ATA** Answer

This command causes the NetComm CardModem GSM to answer an incoming call.

● **ATD** Dial command

ATD causes the NetComm CardModem GSM to dial according to the suffixed modifier. eg. ATD12345 causes the NetComm CardModem GSM to dial 12345.

D# Dial Telephone number (#).

Dial string modifiers:

L Dial last number called.

+ Country code dial prefix.

For software compatibility only :-

^ , P, T, W, @, &, S=n, *#ABCD

● **ATE** Command echo

The ATE command controls the echoing of commands to the DTE device when in command mode.

E0 Command characters not echoed to the DTE.

E1 Command characters echoed to the DTE.

● **ATH** Hang up

The ATH command causes the NetComm CardModem GSM to terminate the call.

● **ATI** Interrogate NetComm CardModem GSM

The ATI commands interrogate the NetComm CardModem GSM and returns the relevant information.

I0 Request 3 digit product code.

I1 Request firmware checksum.

I2 Validate internal firmware checksum (OK response).

I3 Request software release code.

I4 Product identifier.

● **ATO** NetComm CardModem GSM online

The ATO command is to return a NetComm CardModem GSM to data mode when it is on line and in command mode.

● **ATQ** Quiet message control

This command is used to switch result codes from the NetComm CardModem GSM to the DTE device on or off.

Q0 Enable response codes to the DTE.

Q1 Disable response codes to the DTE.

Speed Selection

0	automode
1	V.21 300bps
2	V.22 1200bps
3	V.23 1200/75bps
4	V.22bis 2400bps
5	V.26ter 2400bps
6	V.32 4800bps
7	V.32 9600bps
8	network specific

Bearer Service

0	asynchronous modem
2	GSM dedicated PAD access

Access to the PAD will normally be via the modem option.

☞ Some GSM networks will provide data access by a PAD. When the PAD option is chosen, use a 4 digit access code with the ATD command, for example ATDT1234. You will have to refer to your network operator for the access code.

● AT+CIWF Select interworking function

This command determines whether the NetComm CardModem GSM attempts to connect to a PSTN modem or an ISDN device. For example AT+CIWF=0 selects connection to a PSTN modem.

0	Select PSTN modem
1	Select ISDN device

● AT&C Data carrier detect

AT&C controls how the NetComm CardModem GSM presents the DCD signal.

&C0	DCD is always on
&C1	DCD follows carrier

● AT&D DTR control Status

The AT&D command determines how the CardModem GSM will react to a loss of DTR.

&D0	The CardModem GSM ignores DTR
&D1	The CardModem GSM hangs up
&D2	The CardModem GSM hangs up
&D3	The CardModem GSM performs soft reset

● AT&F Factory reset options

This command loads the selected profile.

&F Load factory configuration.

● AT&K Flow control options

The AT&K command selects the type of flow control to be used by the NetComm CardModem GSM. Flow control is essential when the DTE speed is greater than the actual line speed.

&K0 Disable flow control from DTE to NetComm CardModem GSM.

&K3 Enable RTS/CTS DTE/DCE flow control .

&K4 Enable XON/XOFF DTE/DCE flow control

&K5 Support transparent XON/XOFF DTE/DCE flow control

&K6 Enable RTS/CTS and XON/XOFF DTE/DCE flow control

● AT&R CTS control

AT&R controls the response of the CTS signal. CTS is also affected by the AT&K command.

&R0 CTS operates in accordance with V.24 spec.

&R1 CTS always ON.

● AT&S DSR control

This command determines how the DSR signal operates.

&S0 DSR always ON.

&S1 DSR operates in accordance with V.24 spec.

● AT&V Display CardModem GSM configuration

AT&V displays the current configurations

● AT\N Error correction options

AT\N selects the error correction protocol to be used by the NetComm CardModem GSM. It is preferable to establish non-transparent connections which use RLP (Radio Link Protocol) to automatically correct errors. Should errors be detected, RLP will resend data, therefore your data speed may be less than 9600bps.

\N0 Transparent data connection selected

\N1 Transparent data connection selected

\N2 Non-transparent data connection selected (reliable mode)

\N3 Non-transparent or transparent data connection selected (auto-rel mode)

\N4 Non-transparent data connection selected

\N5 Non-transparent data connection

Messages from the CardModem GSM

When you initially use the NetComm CardModem GSM you will receive verbose messages in response to your commands. You have the choice of receiving no messages, or messages in either verbose or digital form. The table below lists the digital codes and their verbose equivalents. Messages 10 - 19 refer to the DTE speed and not the DCE speed.

<u>Numeric</u>	<u>Long form</u>
00	OK
01	CONNECT
02	RING
03	NO CARRIER
04	ERROR
05	CONNECT 1200
07	BUSY
08	NO ANSWER
10	CONNECT 2400
11	CONNECT 4800
12	CONNECT 9600
13	CONNECT 7200
14	CONNECT 12000
15	CONNECT 14400
16	CONNECT 19200
17	CONNECT 38400
18	CONNECT 57600
19	CONNECT 115200
22	CONNECT 75TX/1200RX
23	CONNECT 1200TX/75RX
40	CARRIER 300
46	CARRIER 1200
47	CARRIER 2400
48	CARRIER 4800
50	CARRIER 9600
70	PROTOCOL: NONE
80	PROTOCOL: RLP

S Registers

Your NetComm CardModem GSM has a set of internal registers which are used to control its operation. These are known as 'S' registers. Many of the S registers are not applicable to every day usage of your NetComm CardModem GSM and can be ignored.

The NetComm CardModem GSM command set includes a command to view the contents of a specific register and another to alter its contents. If you want to examine the contents of register r, use the command: ATSr?

The contents of the specified register are returned to the DTE as a three digit decimal number. The contents of a register can be changed using the command:

ATSr=n

AT? returns the value of the last S register interrogated.

AT=nn modifies the last S register interrogated.

☞ It is recommended that you do not try to modify the contents of the bit mapped S registers. The following section details the function of these S registers.

Register	Range	Units	Default	Description
S0	0-255	rings	0	Rings to auto-answer
S2	0-127	ASCII	43	Escape code character (+)
S3	0-127	ASCII	13	Carriage return character
S4	0-127	ASCII	10	Line feed character
S5	0-127	ASCII	8	Backspace character
S7	1-58	seconds	40	Wait time for carrier
S12	0-255	1/50th second	50	Escape code guard time
S30	0-255	seconds	0	Inactivity disconnect timer
S32	0-255	ASCII	17	XON character
S33	0-255	ASCII	19	XOFF character
S95	0-15, 32-47		0	Result code message format

S register 95 is a bit mapped register, where each bit is a binary representation of a decimal number. For example, if the register is set to a decimal value of 10, in binary format it would read 00001010. When specifying bit mapped registers with multiple options, the bit pattern is displayed in binary format starting with the most significant bit to the left.

-
- S95 (0) Extended result codes
 - Bit 0 Connect result code indicates DCE speed instead of DTE speed
 - Bit 1 Append /ARQ to connect XXX result code if error correction is on
 - Bit 2 Enable carrier XXX result code
 - Bit 3 Enable protocol XXX result code
 - Bit 4 Reserved
 - Bit 5 Enable compression result code
 - Bit 6,7 Reserved

Troubleshooting

Your CardModem GSM is a very robust device and consists of surface mounted electronic components. All CardModem GSM are quality checked prior to dispatch and tested for functionality. Most problems that you may incur are caused by incorrect software set up or network errors.

Before attempting a data or fax call:

- 1 Please ensure that you are receiving a strong signal from the network by referring to the display panel on the phone,
- 2 Check that you have your software set up for the correct serial port (COM1, COM2 etc)
- 3 Check that the card is seated correctly in the slot and that the lead between the NetComm CardModem GSM and the phone are connected.
- 4 If you are in a country other than that in which you purchased your phone, make sure that it has been set up for international roaming. To do so, simply ensure that you can make a normal telephone call.
- 5 Some GSM network service providers require you to inform them that you intend to use a communications card with your phone before you can make use of this facility over their networks.

Possible Problems:

CardModem GSM does not respond to AT commands or your communications software.

Ensure that the card has been detected by Card & Socket Services, or that the enabler has been installed correctly. Please refer to the Installation section of this manual.

Ensure that you have selected the correct Com port in your software. Using the terminal screen in your communications software, type AT&FE1 to return to factory default and turn command echo on.

CardModem GSM connects to the remote service and then intermittently disconnects

Check the signal strength by referring to the display panel on your phone. If you are in a poor reception area this problem may occur.

When using communications software, other than that provided with your CardModem GSM , the connection is not established correctly

Ensure that you are using the correct driver for the CardModem GSM in your communications software. If your card is not listed in your software setup, please choose Hayes 9600.

Your CardModem GSM fails to send a fax.

Check that you have set up your fax software for Class1. Your GSM PC Card will not work if you have selected Class 2.

Glossary of Terms

A

ASCII

The American Standard Code for Information Interchange

Asynchronous Data

Most common type of data, using stop and start bits.

AT commands

Usually called Hayes commands, allows the user to control the CardModem GSM Card.

Autoanswer

The ability of the CardModem GSM to answer an incoming call automatically.

Automode

Allows the CardModem GSM to sense the speed and configure itself accordingly.

B

Baud

One signalling element per second

Bit

BIInary digiT, either 1 or 0

Bps

Bits Per Second

Byte

A group of bits, normally 8 which represent one data character

C

Card and Socket Services

Most DOS-based computers fitted with PC Card slots are supplied with additional software to allow PC Card peripherals to be used, consisting of 'Card Services' and 'Socket Services' drivers.

Card Services

Drivers attempt to detect the type of PC Card peripherals installed and automatically allocate resources, such as IRQ and I/O settings. This is analogous to the way a Plug and Play BIOS automatically allocates resources for expansion cards installed in a PC's expansion bus.

Carrier

A continuous frequency capable of carrying a signal

Class 1

A fax standard allowing a PC to automatically control the fax function. This is the fax standard supported in GSM mode.

CTS

Clear To Send, data control signal

D

DTE

Data Terminating Equipment eg. your PC

DCE

Data Communications Equipment eg. your GSM PC Card

Direct Enabler (Point Enabler)

Although their use allows a multitude of different PC Cards to be used with your computer, and indeed allow more than one PC Card to be installed if it is fitted with more than one slot, Card and Socket Services are not absolutely required in order to use a PC Card peripheral under DOS. This is because an alternative way, using a Direct Enabler, is possible. A Direct Enabler configures a PC Card peripheral directly, and allocates it resources. This type of program is very useful if no Card and Socket Services software is installed on your PC, but does not allow any other type of PC Card peripheral other than the one it is designed to be used with to be installed in your computer when it has been loaded.

E

ERMES

European Radio Message System

Error Correction

Techniques to correct line errors e.g.RLP

ETSI

European Telecommunications Standards Institute.

G

Group 3

Most common type of fax machine.

GSM

Global System for Mobile communications. The digital cellular communications standard which includes a channel specifically for data.

H

Handshaking

A pre-defined exchange of signals enabling GSM PC Cards to establish the data link.

I

Internet

World wide network of computers.

IrDA

Infra Red Data Association. Formed in 1993 to create and promote an interoperable, low cost IR data interconnection standard.

ISDN

Integrated Services Digital Network.

ITU-T

The new name for the CCITT. The governing body that specifies the V Standards for modem communications.

J

JEIDA

Japanese equivalent of the PCMCIA organisation.

M

MO

Mobile Originated

MS

Mobile Station

MT

Mobile Terminated

O

Operator

The cellular network is maintained by an operator.

P

PC CARD

Peripherals standard defined by the PCMCIA.

PCMCIA

Personal Computer Memory Card International Association. Defines standards for PC Card devices.

PSTN

Public Switched Telephone Network, ie. Your analogue phone line.

R

RLP

Radio Link Protocol. A protocol used in the cellular network.

S

SIM

Subscriber Identity Module. A SIM is credit card sized or consists of a small section of the credit card that fits inside your GSM phone.

SMS

Short Message Service. Using the call management channel, and dependent upon the cellular operator and phone used, you can send messages up to 160 characters long.

Socket Services

Drivers provide a standard software interface for programs to communicate with PC Card peripherals installed in any one of the several types of PC Card slot interface electronics available. This is analogous to the way Windows allows programs to communicate with the video card installed in your PC, no matter what make or model it is using a video driver.

V

V.17

14400bps fax standard. The fastest fax standard.

V.21

300bps data standard. A rarely used data transmission speed.

V.22

1200bps data standard. Rarely used now.

V.23

1200/75bps data standard eg. Viewdata, Prestel, Minitel.

V.22bis

2400bps data standard. Rarely used now.

V.27ter

4800bps fax standard. An early fax speed.

V.29

9600bps fax standard.

V.32

9600bps data standard.

V.32bis

14400bps data standard.

V.34

33600bps & 28800bps data.

V.42

Official error correction standard incorporating LAPM and MNP4.

V.42bis

Official data compression standard.

X

X modem

File transfer protocol, one of the first techniques developed. Still popular, but slow.

Y

Y modem

File transfer protocol, useful for non-error corrected links.

Z

Z modem

File transfer protocol, one of the latest and fastest techniques.

Technical Specifications

Operating temperature

Temperature range 0° - +55°C

Relative humidity 95% maximum (non-condensing)

Data facilities

Transparent bearer service

Non - transparent bearer service (error corrected using RLP)

All speeds up to and including 9600bps

AT command set

Fax facilities

Transparent facsimile

Group 3 send and receive

2400, 4800 and 9600bps

Class 1 command set in GSM mode.