SIEMENS

GSM Module M1

Data

Fax

SMS

V.24

User Guide

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GSM Module M1

Product description

The GSM module is a GSM terminal for transmitting data, faxes and SMS (short message service) text messages in GSM networks (GSM = global system for mobile communication).

The GSM Module M1 comprises the following components:

- GSM transceiver;
- Data and power supply unit;
- Serial interface (V.24) for data transmission and control;
- Manufacturer-specific interface for DC power supply, external antenna and audio signals.

When the GSM Module M1 is registered in the network, it serves as a standard modem for fax and data transmission for a computer connected to the V.24 interface. Special AT+C commands as per GSM 07.07 or GSM 07.05 for controlling GSM-related functions (PIN entry, network selection, etc.) and for the short message service are available via the V.24 interface.

Features

The GSM Module M1 offers the following features:

- Transparent data transmission at 2400, 4800 and 9600 bps (BS24,25,26);
- Group 3, Class 2 fax transmission conforming to TR-29.2 at 2400, 4800, 7200 and 9600 bps;
- Short message service mobile originated (SMS MO, TS22)
- Short message service mobile terminated (SMS MT, TS21)

Notes on safety

The GSM Module M1 conforms to GSM standards. However, note that the device can still emit radiation and therefore must not be used or even switched on in certain environments.

- Leaving the GSM Module M1 switched on in airplanes is prohibited by law.
- The module must not be used near service stations, fuel depots, chemical plants or blasting operations.
- The module may also interfere with the functioning of electronic medical devices (hearing aids, pacemakers, etc.) that are not properly shielded. In case of doubt, consult your physician. Do not touch the antenna during a call.
- Using the GSM Module M1 in the direct vicinity of electronic devices (radios, televisions, PCs, etc.) can cause slight interference.

Description of the interfaces

The GSM Module M1 has interfaces for the power supply, for control and data transmission, for an external antenna and for a SIM card as well as an LED that indicates operating statuses. These interfaces will be described below. For a detailed description including pin assignment, see the section entitled "Technical data."

SIM card

The GSM Module M1 must have a SIM card to operate in the GSM network. To install this card, press the yellow button to eject the carrier and insert the SIM in the carrier. Then push the carrier into the housing, making sure that it locks into place.

V.24 interface

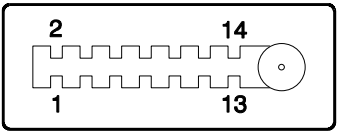
The serial interface is used for controlling the GSM Module M1 as well as for data, fax and SMS transmission.

Connector:	9-pin DSUB (female) conforming to DIN 41652
Pin assignment:	See the section entitled "Technical data"
Logic:	V.24 asynchronous
Baud rates:	2400 - 19200 baud, autobauding
Parity:	None
Character format:	8 data bits
Stop bits:	1
Level:	Conforming to CCITT Recommendation V.28

Hybrid connector (manufacturer-specific)

The hybrid connector contains the power supply, ignition (for switching the device on and off) and the connection for the external antenna (GSM 900 MHz antenna). It is connected via the cable supplied.

Pin assignment:



Meaning of pins: See the section entitled "Technical data."

Function LED

LED off	Device switched off – not ready
LED flashing slowly	Device switched on – ready
LED flashing rapidly	Device switched on – connection setup

For a detailed function indication, use the corresponding AT commands.

Mounting the module

Two standard options are available for mounting the GSM Module M1 :

- Retaining clip
- Velcro

Before applying the velcro, make sure that the surface of the M1 (recess provided in center of base) and the corresponding surface are free of dust and oil.

The mounting location must comply with the following environmental conditions:

- Temperature range -20 °C – +55 °C for full operability
- Temperature from insolation < 110 °C
- Light condensation permissible

Power supply / power consumption

Cable assignment

Power is supplied via the cable included in the scope of supply. The relevant wires are marked as follows:

Red	POWER +8 V – +24 V DC	
Violet	IGNITION(ON/OFF)	
Brown	GND	Ground

Switching the GSM module on/off

The GSM Module M1 switches on when a positive voltage of 5 - 24 V is applied to IGNITION if a voltage of 8 - 24 V is simultaneously applied to POWER.

The module switches off when a voltage of less than +1 V is applied to IGNITION. An existing call is correctly disconnected. This voltage must be applied for a minimum of 550 ms.

Important:

Be sure to switch off the module using IGNITION; simply disconnecting the power supply at POWER can damage the SIM if it is being written to at the time.

Voltage range

Nominal voltage:	13,2 V DC
Extreme voltage:	8 - 32 V DC

Installation / startup

Overvoltage / undervoltage

Correct operation of the M1 in send mode cannot be guaranteed if input voltages fall below 8 V.

When input voltages exceed 32 V, the supply voltage is disconnected in order to protect the electronic components from an overvoltage.

Input voltages >100 V destroy the module.

Protection / on-board network connection

When installed, the M1 must be protected by a medium time-lag fuse with a nominal value of 1A or a fast fuse with a nominal value of 16 A. For vehicle installation the M1 must be directly connected to the battery.

Important:

Do not connect the ground cable to the power supply, since this could result in a short circuit via the antenna cable.

Power consumption

Supply voltage	Channel search	Standby		Send mode	
		Typical	Max.	Typical	Max.
12 V	130 mA	70 mA	150 mA	220 mA	500 mA
24 V	70 mA	45 mA	150 mA	120 mA	500 mA

Setting / testing the COM interface

In order to control the GSM Module M1 and transfer data via the serial interface (COM port), the interface parameters must be set.

The parameters settings are as follows:

COM port:	1-4, depending on which one the M1 was connected to	
Baud rate:	2400 - 19200 baud, autobauding	
Data bits	8	corresponds to 8N1
Parity	None	
Stop bits	1	
Duplex	Full	

For instructions on how to set these parameters, see the user guide for the computer or terminal program used.

In order to test the interface and your settings, enter AT. The GSM module should then respond with OK. If it does not do so, configure a different interface in the communication program and try again. Also check the cable. When this test has been successfully completed, check the functionality of the GSM module by entering AT&T1. This command activates a test loop. From now on, all the characters entered from your GSM module should be echoed on the computer. Terminate the test by entering the escape sequence +++. If the test is acknowledged by the NO CARRIER code, the GSM module's data functionality is operating correctly.

Setting the GSM radio transfer rate

The transfer rate (baud rate) via the radio interface can be set, for example, using a terminal program. The ATBn command allows you to set the transfer rate in the GSM network.

Enter the ATI8 command to display the current list.

ATBn			[n=7,11,13,25,27,29,70,99]
Option	Effect		
	Bit/s	Synchronism	Distant station
ATB99	9600	Asynchronous	Mode set to automode
ATB7	2400	Asynchronous	V.22bis
ATB11	4800	Asynchronous	V.32
ATB13	9600	Asynchronous	V.32
ATB25	2400	Asynchronous	V.110 ISDN
ATB27	4800	Asynchronous	V.110 ISDN
ATB29	9600	Asynchronous	V.110 ISDN
ATB70	9600	Fax	Fax Group 3

Example:

Enter: **ATB13**
M1 Permanently switches mode to 9600 bit/s.

Enter: **ATB7**
M1 Permanently switches mode to 2400 bit/s.

Registering in the GSM network / PIN entry

In order for the GSM module to access the GSM network, you may have to enter the PIN for the SIM card. You can do this using the AT+CPIN="..." command. The AT+CPIN? command allows you to inquire whether or not you must enter a password and what type of password must be entered. The following blocks are possible:

- PIN or PUK
- Device code or PUK of the device code
- Network link: the network operator blocks the device so that, without a network PIN, it runs only in its own network. If you wish to operate the device in another network, you must enter the PIN or PUK.
- Service operator link: similar to the network link but implemented by the service operator rather than the network operator (again, you must enter PIN or PUK).

Note:

The PIN (4-8 positions) is the PERSONAL IDENTIFICATION NUMBER and must be entered to unblock the device. You are allowed 3 attempts to enter your PIN. If you enter the wrong PIN 3 times in a row, the PIN is blocked and must be unblocked by means of a PUK (PIN UNBLOCKING KEY). You are allowed 10 attempts.

You can enter the PUK any number of times for the network link and service operator link.

Example:

Enter:	**AT+CPIN?**	Queries the password to be entered.
GSM module	**+CPIN: SIM PIN**	PIN for the SIM card; must be entered.
Enter:	**AT+CPIN=1234**	PIN entry
M1	**OK**	PIN was correct; the SIM card can be accessed.

After entering the PIN, you can enter the **AT+CREG?** command to determine whether the GSM module is registered in the GSM network.

Setting up and clearing down connections

Normally, you will set up connections with the aid of your communication program. However, you can also manually instruct your GSM module to set up and clear down a connection. The simplest sequence would be as follows: Load your communication program and enter the following command:

Enter:	**AT&F**	Loads factory configuration.
GSM module	**OK**	
Enter:	**ATD<tel. no.>**	The dial command
M1		Dials the telephone number and informs you when it is successful.
	CONNECT xxxx	"xxxx" is the baud rate for the connection. The GSM module is now operating in transparent mode, i.e. entries you make via the keyboard are transmitted to the distant end.
	Pause	
Enter:	**+++**	Interrupt command: Press the "+" key three times in rapid succession.
	Pause	
M1 returns:	**OK**	Changes to command mode.
Enter:	**ATH**	Command to go on-hook
M1 returns:	**OK**	The connection is cleared down; M1 has gone on-hook.

For more information, see Technical reference sec7tion.

Troubleshooting

GSM module can still be accessed

As long as the GSM module is still responding to commands, you can enter the AT&F0 command to load the factory configuration. In any case, this will permit further operation.

- Check whether the communication program is configured for the serial interface to which the GSM module is connected.
- Check the parameters of your communication program. The following settings will always work:

Transfer rate	2400 – 19200 baud
Data bits	8
Parity	None
Stop bits	1
Duplex	Full

Check whether other programs (e.g. printer spooler) are interfering with the functioning of the communication program. Restart your computer without additional programs, with the operating system alone (switch off and then on).

Connection cannot be set up

A number of factors can prevent connection setup.

Own errors

- No SIM card in the module.
- The PIN or another block is not unblocked.
- The GSM data module is not registered, i.e. it has not or has not yet been able to register in the network.
- The M1 was manually set to an unavailable network operator by means of +COPS=1.
- The M1 was signed off of the network by means of +COPS=2.
- Invalid characters in the dial string.
- Dial string contains more than 30 characters.
- Command line contains more than 39 characters.

System errors

- A connection is already set up.
- The call is not answered within 60 seconds after dialing because the distant station:
  – is not ready,
  – is not a modem,
  – does not support the selected operating mode.
  The GSM module returns **NO CARRIER**.
- The distant station is busy. The GSM module returns **BUSY**.
- Before the connection can be set up, the GSM module receives a signal from the computer and returns **NO CARRIER**. If no connection is set up, the GSM module goes on-hook and returns to command mode.
- The GSM network does not or does not yet support the fax/data modes. The GSM module returns **NO CARRIER**.
- The GSM module is not registered in the GSM network. It returns **NO DIALTONE**.
- You have manually dialed a forbidden network operator; the radio modem no longer registers.

Incorrect characters on screen

- Duplicate characters on screen

  Cause: Your communication program is set to half-duplex or echo.

  Remedy: Enter ATE0 to deactivate command echo in command mode or deactivate the echo in the communication program.

- Only the characters from the distant station are incorrect

  Cause: The GSM module's data format does not match that of the distant station.

  Remedy: Set the parameters in your communication program accordingly (data bits, parity, stop bits to 8, N, 1).

GSM module does not dial

Cause: A cable has been disconnected.

Remedy: Make sure that all cables are securely connected. Tighten all connecting screws.

Cause: The GSM network does not or does not yet support the fax/data modes. The GSM module returns **NO CARRIER**.

Remedy: Ask your network operator when these modes will be supported in your network.

Cause: The GSM module has activated barred dialing.

Remedy: Switch the GSM module off and then on.

Cannot receive fax

Cause: Some fax programs that support TR-29.2 Class 2 expect the bits of the fax code to arrive in an order different from the one defined in the SP2388 specification. If the GSM module transmits the fax data bits to the computer in the wrong order, the fax program cannot receive whole fax pages. For this reason, the GSM module has been equipped with the AT+FOPT=n command.

Remedy: Enter one of the following two commands and then check whether the system is functioning correctly: AT+FOPT=1,0 (bit order as specified in TR-29.2 Class 2, Draft SP2388); AT+FOPT=1,1 (opposite bit order, factory configuration for all countries).

Cause: The GSM network does not yet support the fax/data modes. The GSM module returns **NO CARRIER**.

Remedy: Ask your network operator when these services will be supported in your network.

Cause: Your network operator has not released your SIM card for the fax/data modes.

Remedy: Ask your network/service operator to release these features.

Overview of AT commands

General AT commands

A/	Repeat previous command line
+++	Switch to command mode when connected
ATA	Answer call
ATDx	Dial the dial string "x"
ATDIx	Dial ISDN number "x"
ATDL	Redial last telephone number used
ATDS=n	Dial stored telephone number
ATE0	Disable command echo
ATE1	Enable command echo
ATH	Disconnect existing connection
ATIn	Display product data
ATI0	Display product code for GSM module
ATI1	Display software checksum
ATI2	Determine firmware ROM checksum
ATI8	Display supported modes
ATI9	Display device ID
ATO0	Switch from command mode to transparent mode
ATQ0	Display result codes
ATQ1	Do not output result codes to computer
ATSn=x	Assign value "x" to S-register "n"
ATSn?	Read value of S-register "n"
ATS0=n	Go off-hook after n-th ringing signal (n = "1" - "5")
ATS0=0	No automatic answering of calls
ATV0	Display result codes as digits
ATV1	Display result codes as text
ATX0	Display connection without baud rate. Ignore busy signal.
ATX1	Display connection with baud rate. Ignore busy signal.
ATX2	Same as ATX1
ATX3	Same as ATX1 but report BUSY
ATX4	Same as ATX3
ATZn	Load user profile "n"
AT&C0	DCD always ON
AT&C1	DCD line ON only in the presence of carrier signal (connection)
AT&D0	Ignore DTR status
AT&D1	At DTR -> OFF: Command mode without going on-hook
AT&D2	At DTR -> OFF: Go on-hook, command mode, auto-answer off
AT&D3	At DTR -> OFF: Go on-hook, factory configuration same as AT&F
AT&F	Load factory configuration
AT&T0	Terminate an active test
AT&T1	Initiate local digital test loop
AT&V	Display current configuration
AT&Wn	Store current configuration as user profile "n"
AT&Yn	Load user profile "n" at power-up

AT&Zn=x	Store telephone number "x" in memory "n"
AT%Dn	Automatic dialing with DTR
AT+	Fax commands

GSM AT commands (GSM 07.07)

AT+CGMI	Display manufacturer ID
AT+CGMM	Display model ID
AT+CGMR	Display version of GSM module
AT+CGSN	Display serial number (IMEI)
AT+CHUP	Terminate all calls
AT+CEER	Display reason last call was disconnected
AT+CMEE	Extended error messages to GSM 07.07
AT+CREG	Display registration status
AT+COPS	Commands relating to network operator selection
AT+CPIN	Enter PIN and query blocks
AT+CPIN2	Enter PIN2 and query PIN2 blocks
AT+CPWD	Change PIN
AT+CSQ	Display signal quality information
AT+CKPD	Key simulation
AT+CXXSN	Single-numbering parameterization
AT+CXXMOC	Parameterize for outgoing calls
AT+CPBS	Select phonebook
AT+CPBR	Read phonebook entry
AT+CPBW	Write phonebook entry
AT+CBST	Select bearer service type
AT+CRC	Cellular result code
AT+CLIP	Calling line identification presentation
AT+CPAS	Phone activity status
AT+FCLASS	Select mode
AT+CXXCID	Card identification

SMS AT commands (GSM 07.05)

AT+CSMS	Select message service
AT+CPMS	Preferred message storage
AT+CMGF	Message format
AT+CSCA	Service center address
AT+CMGR	Read message
AT+CMGS	Send message
AT+CMGW	Write message to memory
AT+CMGD	Delete message
AT+CNMI	New message indications
AT+CMGL	List messages

Please note: The GSM module also recognizes some AT-standard commands that it does not execute, but it ignores these commands and returns either OK or ERROR.

The AT standard

With the development of intelligent modems, an command language was introduced in the U.S. called the AT standard. Over the past few years, this language has been consistently enhanced and has gained international acceptance. Most modems and communication programs work with this command language or can be set to use it.

AT command line prefix

The AT standard is a line-oriented command language. Each command line must begin with the letters AT, with the sole exception of the A/ command. The commands are introduced at the end of this section. The letters AT are also known as the attention code. The attention code signals your GSM module that one or more commands will follow. The GSM module examines this command line prefix.

Connecting to your GSM module

You have connected your GSM module to your PC. You can now connect to your GSM module. To do so, start up a communication program on your PC.

Set the following transmission parameters (characteristics):

COM interface:	1 - 4, depending on which one the M1 is connected to
Rate:	2400 - 19200 baud
Data bits:	8
Parity:	None
Stop bits:	1
Duplex:	Full

The GSM module supports autobauding on the V.24 interface with transfer rates from 2400 to 19200 baud and the data format 8N1.

Command syntax of the AT standard

- Command lines must always begin with AT.
- Multiple commands can be combined on one command line. To improve legibility, you can enter spaces between the individual commands. The GSM module ignores these spaces.
- Commands that are specified in this manual with "0" in the last position can also be entered without this "0". Example: ATQ has the same effect as ATQ0.
- A command line must end with a <CR> character, which is entered by pressing "Enter" on the keyboard. This fact will not be mentioned again in this manual.

- The <CR> character can be followed by a <LF> character but this character will be ignored by the GSM module.

  Sample command lines:
  ATH
  ATS7?Q0E1
  ATD0123456789

- When making corrections, use the Backspace key or Ctrl-H to delete the character to the left of the cursor.
- The command line is not executed until the <CR> character is received.

Loading the factory configuration and displaying a configuration

The AT&F and AT&V commands allow you to load and display the factory configuration.

Enter: **AT&F0**
M1 returns: **OK**

Enter: **AT&V**
M1: Loads the factory configuration and transfers it to the PC. The settings are displayed on the screen.

ATVn - Result codes

The GSM module acknowledges all commands.

Example:

Enter: **AT&F0**
M1 returns: **OK**

The ATVn command allows you to determine whether result codes will appear as alphanumeric text or a numerical code:

ATVn [n=0,1]	
Option	Result
ATV0	Selects the short result code format (digits). Useful if the GSM module is to be controlled from the computer using a communication program.
ATV1	Selects the long result code format. Factory configuration.

Overview of the short and long result code formats		
Short code	Long code	Meaning
0	**OK**	Command executed, no error
1	**CONNECT**	Connection set up
2	**RING**	Ringing signal detected
3	**NO CARRIER**	Connection not set up or disconnected
4	**ERROR**	Incorrect command or command too long. The AT+CMEE= 2 command allows you to display extended error messages to GSM 07.07.
6	**NO DIALTONE**	Connection cannot be set up.
7	**BUSY**	Distant station busy
10	**CONNECT 2400**	Connection at 2400 bit/s
30	**CONNECT 4800**	Connection at 4800 bit/s
32	**CONNECT 9600**	Connection at 9600 bit/s

Please note:

In both cases, result codes are made up of ASCII characters. Long result codes must begin and end with <CR> and <LF> characters. Short result codes only end with a <CR> character.

A/ - Repeat previous command line

The A/ command allows you to reissue the previous command line in its entirety. This is the only command that is not preceded by AT and that does not have to end with <CR> (Enter). A/ is mainly used when the line was busy or the call was not answered. In this case, the GSM module repeats the dial command.

Example:

Enter: **AT D 01999341**
GSM module: **BUSY**

Enter: **A/**
GSM module: Reissues the command (= D 01999341).

Setting up and clearing down connections

Once you have read through this section, you will be able to use your GSM module together with your communication program to perform the following functions:

- Interrupt a connection using the escape command.
- Go off-hook.
- Set up a connection by manually dialing the telephone number.
- Store a telephone number.
- Dial a stored telephone number.
- Answer a call.
- Switch to auto-answer.

Operating modes

The GSM module operates in two different modes:

- Command mode
- Transparent mode

Command mode

When you switch on your system, the GSM module is in command mode and is ready to receive and execute your commands. All characters that the GSM module receives via the COM interface in this mode are interpreted as commands and, if a phone connection is present, are not transferred to the distant station.

Transparent mode

In transparent mode, the GSM module transfers every character sent and received via the COM interface just as it is.

Escape command

Before attempting to dial your first call, you must know how to interrupt or disconnect a call at any time. This involves the following two steps:

- Enter + + + to switch to command mode.
- Disconnect the call by entering ATH.

Example:

Situation: The GSM module is operating in transparent mode, i.e. a connection is set up to a distant station.

Change to command mode:

- Do not press any key for at least one second.
- Press the + key three times in rapid succession (within one second).
- Do not press another key for at least one second.

The GSM module switches to command mode, i.e. it interrupts the flow of data and

returns the result code OK. The connection is not yet cleared down. The pause before and after the "+" characters ensures that the GSM module will interpret this command as the escape command in transparent mode and will then switch to command mode.

Going on-hook

- Disconnect the call by entering ATH (see next section).

ATH - Go on-hook

In command mode, the ATH command causes the GSM module to disconnect an existing call. The call is also disconnected if the distant station goes on-hook or the radio connection in the GSM network is interrupted.

ATOn - Return to transparent mode

If you wish to interrupt the data flow only briefly, you can use the ATOn command to return your GSM module to transparent mode, i.e. the data flows once again.

ATOn [n=0]	
Option	Result
ATO0	Switches the GSM module back to transparent mode when it was previously switched to command mode.

Setting the transfer rate

The GSM module supports the following transfer rates:

Transfer rates		
Rate Bit/s	Bearer service	Corresponding modem types
2400	24	Analog modems conforming to V.22bis, ISDN adapter to V.110 ISDN
4800	25	Analog modemso conforming to V.32 with fallback, ISDN adapter to V.110 ISDN
9600	26	Analog modems conforming to V.32, ISDN adapter to V.110 ISDN

To change and permanently set the rate for the radio link, use the ATBn command.

Example:

Your PC is set to 19200 baud, i.e. higher than the maximum GSM transfer rate of 9600 bit/s. This means that the GSM module receives more data from the PC than it can transfer to the GSM network. In order to prevent a data overflow, the module must be able to interrupt the data flow from the PC. This is accomplished by means of the RTS/CTS hardware data flow control.

ATBn - Select GSM module's operating mode

The ATBn command also allows you to set the GSM module's operating mode permanently for all connections.

ATBn			[n=7,11,13,25,27,29,70,99]
Option	Result		
	Bit/s	Synchronism	Distant station
ATB99			Automatically sets the mode to match the baud rate set for the PC. Factory configuration
ATB 7	2400	Asynchronous	V.22bis
ATB11	4800	Asynchronous	V.32
ATB13	9600	Asynchronous	V.32
ATB25	2400	Asynchronous	V.110 ISDN
ATB27	4800	Asynchronous	V.110 ISDN
ATB29	9600	Asynchronous	V.110 ISDN
ATB70	9600	Asynchronous	Fax Group 3

Example:

Enter: **ATB13**
GSM module: Permanently switches the mode to 9600 bit/s with the result that all radio connections are permanently set to a transfer rate of 9600 bit/s.

Enter: **ATB99**
GSM module Automatically changes to the rate of the COM interface.

ATD - Dial a telephone number

In order to dial a telephone number, enter the ATD command followed by the number.

Example:

Enter:	**ATD 0199341**
GSM module	Dials the telephone number 0199341
and returns:	**CONNECT 2400**

As soon as the module detects the carrier for the distant station, it returns the CONNECT result code. Data transfer can now begin.

Valid dial strings

- A dial string comprises digits from "0" to "9" (the telephone number), letters "A" to "C" and the special dialing characters "i","+" and ";".

  i — This character must be located between the ATD command and the telephone number (ATDix) and causes the GSM module to switch to ISDN mode for this call.

  \+ — This character must be located at the beginning of a dial string and serves to access the international exchange of a GSM network.

Example:

You are in Sweden and wish to set up a connection to Munich.
Dial: **ATD+4989<telephone number>**

- A dial string must contain no more than 30 characters. A longer string will not be dialed.
- A command line including the dial string must not exceed 39 characters. Although longer command lines are displayed, they are rejected in their entirety.

  Example:

  ATD0045890235168338
  This dial string comprises 16 characters. The command line on the screen contains 19 characters.

ATDL - Redial last telephone number used

This command allows you to redial the last telephone number that you dialed, regardless of whether the last dialing attempt was successful.

Example:

Enter:	**ATD123456789**	GSM module dials 123456789
GSM module:	**BUSY**	The number is busy.
Enter:	**ATDL**	
GSM module:	Redials 123456789.	

AT%Dn - Automatic dialing with DTR

The AT%Dn command allows you to activate and deactivate automatic dialing of the telephone number stored in telephone number memory "0". The number is dialed if the computer sets the DTR control line connected to the COM interface to ON.

AT%Dn [n=0..1]	
Option	Result
AT%D0	Deactivates automatic DTR dialing.
AT%D1	Activates automatic DTR dialing if DTR switches from OFF to ON; dials the telephone number "x" that was stored in telephone number memory "0" by means of the AT&Z0=x command.

Example:

Enter:	**AT&Z0=123456789**	Stores the telephone no. "123456789" in telephone number memory "0".
GSM Data_Module:	**OK**	Telephone number has been stored.
Enter:	**AT%D1**	Activates DTR dialing.
GSM module:	**OK**	Command has been executed.
	DTR is OFF	
	DTR switches ON	"123456789" is dialed automatically.
	DTR switches OFF	GSM module goes on-hook.

ATA - Answer a call

The GSM module does not automatically answer calls after you switch on your computer. In accordance with the factory configuration, it does not go off-hook. The ATA command causes your GSM module to go off-hook when the phone rings. You determine whether or not you wish to answer.

ATS0=n - Auto-answer mode

The ATS0=n command allows you to configure your GSM module so that it will automatically answer calls. "n" represents the number of ringing signals before the call is answered. Permissible values are from "0" to "5".

ATS0=n [n=0..5]	
Option	Result
ATS0=0	No auto-answer: incoming calls are ignored.
ATS0=1	The GSM module goes off-hook after the first ringing signal.
...	etc.
ATS0=5	The GSM module goes off-hook after the fifth ringing signal.

You can use the ATA command to answer calls at any time, regardless of these settings.

Displaying and storing a configuration

The GSM module works with a set of parameters that determine its functioning. This set of parameters is called the active configuration profile. Values for these parameters are predefined in a factory configuration that you can use at any time when you load it using the AT&F command. The GSM Module M1 allows you to modify the active configuration profile by means of AT or S-register commands. These options will be described in subsequent sections. When you switch off the GSM module, any changes you made to the active configuration profile are lost. When you switch it on again, the active configuration profile once again corresponds to the factory configuration. However, the GSM module has two nonvolatile memory blocks in which you can store configuration profiles (AT&Wn command, page 29). These blocks are user profiles "0" and "1". When you switch on your system, the GSM module loads the user profile that you set by means of the AT&Yn command. For more information, see the section entitled “AT&Yn - Configuration at power-up.”

Please note:
When the module is supplied, both user memories contain the factory profile.

AT&F - Load factory profile

This command allows you to load the factory profile that was supplied with the GSM module.

AT&F	
Option	Result
AT&F	If your GSM module stops functioning due to a faulty configuration, this command resets the module to the factory configuration.

AT&V - Display configuration

The AT&V0 command allows you to display the active configuration profile on the screen.

Enter: **AT&V**

The GSM module then transfers the information to the computer, which displays it on the screen.

Example:

You have a GSM module and have loaded the factory configuration by means of the AT&F command. Now enter the AT&V command. The following is displayed on the screen:

```
AT&V
ACTIVE PROFILE:
B99 E1 L2 M1 Q0 V1 X4 Y0 %D0 &C1 &D2 &G0 &Y0
S00:000 S01:000 S02:043 S03:013 S04:010 S05:008 S06:002 S07:060 S08:002
S09:006 S10:007 S12:050 S14:6AH S16:00H S18:000 S21:30H S22:46H S23:1CH
S25:005 S26:001 S27:00H

STORED PROFILE 0:
B99 E1 L2 M1 Q0 V1 X4 Y0 &C1 &D2 &G0
S00:000 S14:6AH S18:000 S21:30H S22:46H S23:1CH S25:005 S26:001 S27:00H

STORED PROFILE 1:
B99 E1 L2 M1 Q0 V1 X4 Y0 &C1 &D2 &G0
S00:000 S14:6AH S18:000 S21:30H S22:46H S23:1CH S25:005 S26:001 S27:00H

TELEPHONE NUMBERS:
&Z0=
&Z1=
&Z2=
&Z3=

OK
```

Configuring the module using AT commands

This section describes the standard AT commands that allow you to configure your GSM module. These commands are grouped according to subject area.

Screen outputs

Limits of screen outputs

When you receive data that is reproduced on the screen (data echo), the text is usually shifted upward when the edge of the screen is reached. When you generate screen outputs using AT commands (e.g. AT&V), a maximum of 30 lines is displayed for each command. If, for example, you enter the AT&V command several times on the same line (AT&V&V&V), a maximum of 30 lines is displayed.

ATEn - Command echo

The ATEn command affects the echo of characters that the GSM module receives from your computer when the GSM module is in command mode.

ATEn [n=0,1]	
Option	Result
ATE0	Command echo off: Select the ATE0 setting when the computer itself is echoing keyboard entries on the screen and no command echo is expected from the GSM module. Please note: If you enter the ATE0 command and your computer is expecting character echo, the computer will no longer display the entered characters on the screen. You are then working blind.
ATE1	Command echo on: Select the ATE1 setting when your computer is configured to expect the characters received by your GSM module to be returned. Factory configuration.

ATQn - Activate and deactivate result codes

The ATQn command allows you to control the transmission of result codes as acknowledgments to AT commands (e.g. OK, ERROR, RING).

ATQn [n=0,1]	
Option	Result
ATQ0	Outputs result codes.
ATQ1	Suppresses result codes. Important for unattended operation.

ATXn - Extended connect message

ATXn [n=0..4]	
Option	Result
ATX0	The GSM module returns only the CONNECT code as soon as a satisfactory connection has been set up. A busy signal is ignored.
ATX1	The GSM module transmits an extended connect message with transfer rate information (CONNECT xxxx) as soon as a satisfactory connection has been set up. For more information on extended result codes, see the ATV1 command. A busy signal is ignored.
ATX2	Same as ATX1.
ATX3	As in the case of ATX1, the GSM module transmits an extended connect message. A busy signal is detected and, if applicable, the BUSY code is returned.
ATX4	As in the case of ATX1, the GSM module transmits an extended connect message. A busy signal is detected and, if applicable, the BUSY code is returned.

Control line options

AT&Cn - Data Carrier Detect (DCD) options

This command affects the DCD line connected to the computer's serial interface.

AT&Cn [n=0,1]	
Option	Result
AT&C0	The GSM module sets the DCD control line connected to the computer's serial interface to ON regardless of the data carrier status of the distant station.
AT&C1	DCD specifies the data carrier status of the distant station. DCD ON indicates that a connection exists.

AT&Dn - Data Terminal Ready (DTR) options

AT&Dn	[n=0..3]
Option	Result
AT&D0	The GSM module ignores the status of the DTR control line connected to the COM interface.
AT&D1	When the DTR line switches from ON to OFF, the GSM module changes to command mode. The existing connection to the distant station is not cleared down.
AT&D2	When the DTR line switches from ON to OFF, the GSM module sets up a connection to the distant station, switches to command mode and deactivates auto-answer mode. Auto-answer can be reactivated by resetting DTR to ON.
AT&D3	The transition of DTR to OFF has the same effect as an AT&F command, i.e. the factory configuration is loaded. An existing connection to the distant station is cleared down.

Data flow control

Even if your PC is set, for example, to 19200 baud, the maximum GSM rate that can be used is 9600 bit/s. A higher setting causes the GSM module to receive more data from the PC than it can transfer to the GSM network. In order to prevent a data overflow, it must be able to interrupt the data flow from the PC. This is accomplished by means of the RTS/CTS hardware data flow control, which switches over the COM interface so as to interrupt the RTS (computer) and CTS (GSM module) control lines.

Memory commands

The GSM module is equipped with a 128-byte nonvolatile RAM in which the values of the modifiable S-registers and other values are stored. This section describes the values, how to store them and how to use them.

AT&Zn=x - Store telephone number

The user memory can hold 4 telephone numbers. The AT&Zn= command allows you to store a dial string in telephone number memory "n" (n represents a value from "0" to "3").

Example:

Enter: **AT&Z0 = 01999341**
GSM module: **OK**

The AT&Zn= command saves only digits and special characters ("i", "+"). It ignores punctuation, spaces and all meaningless characters. The dial string must contain no more than 20 characters. If you enter a longer dial string, it is not stored and the ERROR code is displayed on the screen. The AT&Zn= command itself is not stored with the dial string.

ATDS=n - Dial stored telephone number

The ATDS=n command allows you to dial the "n"-th stored telephone number (n represents a value from "0" to "3"). This command dials the dial string as though it were a telephone number entered directly via the keyboard.

Example:

Enter: **ATDS=0**
GSM module: **01999341** and initiates the dialing procedure.

AT&Wn - Store configuration

When you modify the active configuration profile using AT or S-register commands, these modifications exist only in the RAM and are deleted when you switch off your GSM module. When switched on again, the GSM module loads the configuration from a nonvolatile memory. The AT&Wn command allows you to store your modifications in this nonvolatile memory. Two separate memory areas are available for this purpose.

AT&Wn [n=0,1]	
Option	Result
AT&W0	Stores the active configuration profile in user memory "0".
AT&W1	Stores the active configuration profile in user memory "1".

Consequently, you always have two different user profiles in your GSM module ready to be called up.

AT&Yn - Configuration at power-up

The AT&Yn command allows you to determine which user profile ("0" or "1") will be loaded at power-up.

AT&Yn [n=0,1]	
Option	Result
AT&Y0	The profile in user memory "0" will be loaded at power-up. Factory configuration
AT&Y1	The profile in user memory "1" will be loaded at power-up.

Please note:
When the module is supplied, both user memories contain the factory configuration.

ATZn - Load user profile

Regardless of how your active configuration profile is currently set up, the ATZn command allows you to reload your own user profile at any time. Any existing connection is cleared down.

ATZn [n=0,1]	
Option	Result
ATZ0	Load user profile "0".
ATZ1	Load user profile "1".

AT+C commands for GSM

Special AT commands are used for controlling GSM-related functions of the GSM Module M1 such as PIN entry, network selection and IMEI output and for controlling the short message service. These commands start with AT+C and are specified in the Technical Specifications (TS) GSM 07.07 for the general part and GSM 07.05 for SMS from the ETSI (European Telecommunications Standards Institute). Standardization is not yet complete. Some of the commands implemented in the GSM Module M1 may still be changed within the framework of the standardization process. For the purpose of future compatibility, these commands are always prefixed by +CXX.

Example:

Enter: **AT+CXXSN = ?**
GSM module **+CXXSN: 1=voice/FAX**

The implementation of the AT+C commands for GSM-related functions of the GSM Module M1 is based on TS GSM 07.07 Version 0.1.0.

AT+CGMI - Request manufacturer ID

This command provides you with the name of the module manufacturer.

AT+CGMI	
Option	Result
AT+CGMI	Displays manufacturer.

Example:

Enter: **AT+CGMI**
GSM module: **+CGMI: SIEMENS**
OK

AT+CGMM - Request model ID

This command provides you with the name of the module.

AT+CGMM	
Option	Result
AT+CGMM	Displays module name.

Example:

Enter: **AT+CGMM**
Response: **+CGMM: M1**
OK

AT+CGMR - Request revision ID

This command provides you with the version of the GSM module and the software creation date.

AT+CGMR	
Option	Result
AT+CGMR	Displays the version number and creation date.

Example:

Enter: **AT+CGMR**
GSM module: **+CGMR: Ver.02.001 10.08.95**
OK

AT+CGSN - Request product serial number ID

This command provides you with the serial number of the GSM module. The serial number has the GSM format.

AT+CGSN	
Option	Result
AT+CGSN	Displays the serial number. In GSM, each mobile telephone is assigned a unique number, known as the IMEI (International Mobile Equipment Identity).

Example:

Enter: AT+CGSN
GSM module: IMEI: 445199518750
OK

AT+CHUP - Hangup call

This command allows you to terminate all calls.

AT+CHUP	
Option	Result
AT+CHUP	Terminate all calls.

Example:

Enter: AT+CHUP
GSM module: OK

AT+CEER - Extended error report

This command allows you to query the reason why the last call was disconnected. The information returned can be useful if there were problems with connection setup or if a connection was interrupted.

AT+CEER	
Option	Result
AT+CEER	Displays reason last call was disconnected.

Example:

Enter: **AT+CEER**
GSM module: **+CEER: 10,08**
OK

AT+CMEE - Report mobile equipment error

If an error occurs while you are processing a command by means of AT+C, the problem may be located in the data or GSM section of the M1. For example, if a data connection is set up, the phonebook cannot be accessed at the same time. Or is the problem in the SIM card? Is it inserted or has the PIN been omitted? Extended error messages help you isolate errors more easily. However, you must first enable these messages from the PC using this command.

AT+CMEE	
Option	Result
AT+CMEE=<mode n>	Resets the mode.
AT+CMEE?	Displays the way in which error messages are reported to the PC.
AT+CMEE=?	Displays the modes supported by the M1 in the form of a complete list of the values that can be assumed by <mode n>.

<mode n>	n= [0..2]
0	The error messages are not interpreted but, generally, only an ERROR code is returned.
1	When an error occurs, an extended message to the PC is generated that specifies the cause of error as a number.
2	Same as “1“ except that the error is output as text.

Possible error messages in response to an AT+C command	
0	Phone failure
1	No connection to phone (transceiver part of M1)
2	Transceiver-adaptor link reserved
3	Operation not allowed
4	Operation not supported
5	PH-SIM PIN required
10	SIM not inserted
11	SIM PIN required
12	SIM PUK required
13	SIM failure
14	SIM busy
15	SIM wrong
16	Incorrect password
20	Memory full
21	Invalid index
22	Not found
23	Memory failure
24	Text string too long(+CPBW)
25	Invalid characters in text string
26	Dial string too long
27	Invalid characters in dial string
30	No network service
31	Network timeout
100	Unknown

Example:

Enter: **AT+CREG?**
GSM module: **+CME ERROR: 10**

AT+CREG - Network registration

Data transmission is possible only if the GSM module is registered in the network. This command provides you with information on the module's registration status in the network.

AT+CREG	
Option	Result
AT+CREG?	Displays mode n and the registration status < CREG STATUS n>.
AT+CREG=?	Displays a list of the modes supported.
AT+CREG=<mode n>	Selects a new mode.

AT+CREG?	
Command	**AT+CREG?**
Result code	**+CREG:** <mode n>, <CREG status>

<mode n>	n= [0]
0	Changes in registration status are not forwarded to the PC.

<CREG status>		status= [0..3]
STATUS n	Meaning	Explanation
0	Not registered; ME is not searching for a new operator.	No network operator found; the GSM module cannot register, nor is it searching for a new operator.
1	Registered	The GSM module has successfully registered in the network and all services are available.
2	Not registered, but ME is searching for a new operator.	The M1 is not registered but is searching for a new network operator. See AT+COPS, commands relating to network operator selection.
3	Registration denied.	The selected network cannot be accessed at this time.
4	Unknown	The current status in relation to the network cannot be determined at this time.

Example:

Enter: **AT+CREG?**
GSM module: **+CREG: 0,0 => not registered**
OK

AT+COPS - Operator selection

These commands allow you to read out the current network operator, display a list of available network operators or select a operator directly. Various command extensions are available.

AT+COPS	
Command	Result
AT+COPS?	Displays current network operator.
AT+COPS=?	Displays a list of network operators that are currently available via radio.
AT+COPS=<mode n>, <format f>, <network operator>	Allows you to instruct the GSM module to use a specific network operator.

AT+COPS? - Display current network operator

This command displays the network operator that is currently selected. It also provides you with information on whether the radio modem has selected this network operator automatically or whether you manually instructed it to select this operator.

A result code with the following format is returned in response to the AT+COPS? command:

AT+COPS?	
Command	AT+COPS?
Result code	+COPS: <mode n>, <format f>, <operator>

< mode n>		n= [0...3]
Mode n	Meaning	Explanation
0	Automatic	Network operator is selected automatically.
1	Manual	Network operator is selected manually.
2	Sign off of network	The GSM-M1 is signed off of the network.
3	Sets format f only.	You can select the format for displaying the network operator. This is true only of the read command AT+COPS?.

<format f>		n= [0..2]
0	Long, alphanumeric format	The operator is displayed in 16-character alpha-numeric format.
2	Numeric format	The operator is displayed in numeric format.

Operator	Network operator	The network operator is displayed in format f.

Example:

Enter: **AT+COPS?**
GSM module: **+COPS: 0, 0, " Operator Name "**
OK

AT+COPS=? - Display list of available network operators

This command instructs the module to display a list of available network operators. The list must first be generated. That process can take up to 60 seconds.

AT+COPS=?	
Command	**AT+COPS=?**
Result code	**+COPS:** List with (<STATUS n>, <operator, alphanumeric format>, <operator, numeric format>)

Evaluate the result code using the following table:

<+COPS status n>		n= [0..3]
STATUS n	Meaning	Explanation
0	Unknown	Status unknown
1	Available	Network operator is available.
2	Current	This network operator is the one currently in use.
3	Forbidden	This network operator is forbidden.

Operator	Network operator	Displays the network operator in text format and numeric format.

Example:

Enter: **AT+COPS=?**
GSM module: **+COPS: (2, " D1 TELEKOM ", "26201"),**
+COPS: (3, " D2 PRIVAT ", "26202")
OK

AT+COPS= .., .. - Use this network operator

This command allows you to select a network operator manually or to activate the automatic selection of a network operator. It is recommended that you first display a list of available network operators.

AT+COPS= <mode n>, <format f>, <operator>	
Mode n	Mode n specifies how the new network operator is to be selected. The meaning is the same as for the AT+COPS? read command.
Format f	<format f> specifies the format to be used for displaying the operator. The GSM M1 supports only the numeric format for selection.
Operator	The network operator to be used (numeric format).

Example:

Enter: **AT+COPS=0** The M1 automatically searches for a operator.
M1: **OK**

Enter: **AT+COPS=1, 2, "26201"**
GSM module: **OK**

Please note:
The GSM module must not register when you select a forbidden operator manually! Otherwise, you will not be able to set up any more connections. Display the list to find out which operators are forbidden and which are allowed. Use the AT+CREG command to find out whether or not the GSM module is registered. You will also be unable to set up any connections if you have set mode n to "2" (sign off of network).

AT+CPIN - Enter PIN and query blocks

The PIN (personal identification number) is provided to prevent unauthorized use of the GSM module. The PIN is usually a 4-position secret code. If this block is activated, you must enter your PIN before you can use the module's full range of functions. When you query the status, the system displays result codes relating to the chip card and tells you either that you must enter a PIN or that the chip card has already been read, in which case PIN entry is unnecessary.

AT+CPIN	
Command	Result
AT+CPIN?	Queries the PIN that must be entered.
AT+CPIN=<PIN>[, <new PIN>]	PIN entry. The PIN can comprise up to 8 positions. If a PUK must be entered, the PIN is entered at the same time. It will then be stored as a new PIN.

AT+CPIN?	
Result code	Meaning
+CPIN: READY	M1 expects no further password. All blocks are released and services are available without restriction.
+CPIN: SIM PIN	M1 expects the PIN for the SIM card.
+CPIN: SIM PUK	M1 expects the PUK for the SIM card, including a PIN.
+CPIN: PH-SIM PIN	M1 expects a device code.
+CPIN: PH-SIM PUK	M1 expects the device PUK, including a PIN that is stored as a device code.

Example:

You enter the correct PIN:

Enter: **AT+CPIN="1234"**
GSM module: **OK**

You enter an incorrect PIN:

Enter: **AT+CPIN="1234"**
GSM module: **+CME: ERROR: WRONG PASSWORD**

AT+CPIN2 - Enter PIN2 and query PIN2 blocks

Phase 2 includes SIM cards with an FDN phonebook. You can activate a block on the card in order to restrict the telephone numbers that can be called to those contained in this directory. To modify these entries, you must enter PIN2 with the aid of the AT+CPIN2 command. All entries are similar to those for the AT+CPIN command. This command is accepted only if the card also supports this functionality.

Please note: PIN2 protects the FDN phonebook. In order to modify the FDN phonebook by means of the AT+CPBW=... command, you must first enter PIN2. If you have not yet done so, an error message is returned. After entering PIN2, you can read or write any number of directory entries without having to enter PIN2 each time. As soon as you use a command that is not related to the phonebook, PIN2 is "forgotten."It is also forgotten if you do not access the phonebook for a period of 5 minutes.

AT+CPIN2	
Command	Result
AT+CPIN2?	Queries whether PIN2 has already been entered, must still be entered or is blocked.
AT+CPIN2=<PIN>[, <new PIN>]	PIN2 entry. PIN2 can comprise up to 8 positions. If PUK2 must be entered, PIN2 is entered at the same time. It is then stored as a new PIN2.

AT+CPIN2?	
Result code	Meaning
+CPIN: READY	M1 does not expect PIN2; it has already been entered.
+CPIN: SIM PIN2	M1 expects PIN2 for the SIM card.
+CPIN: SIM PUK2	M1 expects PUK2 for the SIM card, including PIN2.

Example:

You enter the correct PIN2:

Enter: **AT+CPIN2="1234"**
GSM module: **OK**

You enter an incorrect PIN2:

Enter: **AT+CPIN2="1234"**
GSM module: **+CME: ERROR: WRONG PASSWORD**

AT+CPWD - Change password

This command allows you to change the password. Since more than one password will be available for future uses, you must specify the name of the password upon entering it.

AT+CPWD	
Command	Result
AT+CPWD=?	Displays a list of the passwords supported. These currently include the PIN, device code and PIN2.
AT+CPWD=<name>, <old password>, <new password>	This command instructs the GSM module to change the relevant password. When changing the password, you must enter both the old and new password. This ensures that changes can be made only if access is authorized.

Example:

Enter: **AT+CPWD=?** Requests the list of passwords (SC = SIM, PS = device code, P2 = PIN2)
GSM module: **+CPWD: ("SC,8","PS,8", "P2,8")**
OK

Enter: **AT+CPWD= "sc","1234","4321"**
GSM module: **OK** Password was successfully changed.

The following result code is returned if the old PIN you enter is incorrect:

Enter: **AT+CPWD= "sc","0123","4321"**
GSM module: **+CME ERROR: INCORRECT PASSWORD**
The password was not changed because the old PIN was incorrect.

AT+CSQ - Signal quality

The quality of the radio connection between the GSM module and the base station varies depending on environmental conditions. This command provides you with information on the current reception quality.

AT+CSQ	
Command	Result
AT+CSQ	Displays current receive values.
AT+CSQ=?	Displays a list of values representing receive levels and receive errors.

AT+CSQ, AT+CSQ=?	
Command	**AT+CSQ**
Result code	**+CSQ: <receive level>, <receive errors>**
<receive level>	
0	-113 dBm or less
1	-111 dBm
2...30	-109... -53 dBm
31	-51 dBm or greater
99	Unknown or cannot be detected
<receive errors>	(As a percentage): See GSM 05.08, section 8.2.4, Range of Parameter.
99	Unknown or cannot be detected

Example:

Enter: **AT+CSQ**
GSM module: **+CSQ: 10, 1**
OK

AT+CKPD - Keypad control

This command allows you to simulate keystrokes on the GSM mobile telephone. Input corresponds to the actuation of keys on the Siemens S3COM.

AT+CKPD	
Command	Result
AT+CKPD=<key>	Instructs the GSM module to simulate the key <key>.
AT+CKPD=?	Displays a list of keys that are supported.

AT+CKPD=?	
Command	**AT+CKPD=?**
Result code	**+CKPD: "0123456789*#CDEISUXYZ[]"**
<key>	Meaning of the keys
0-9, *,#	Key 0 - 9, "*,"#"
"C" or "c"	Clears the display.
"E" or "e"	Simulates the End key.
"I" or "i"	Simulates the Info key.
"S" or "s"	Simulates the Start key.
"X" or "x"	Phonebook key
"Y" or "y"	Deletes the last character.
"Z" or "z"	Exits menu.
[	Simulates the left softkey.
]	Simulates the right softkey.

Example:

You would like to enter the key combination "*#06#":

Enter: **AT+CKPD=*#06#**
GSM module: **OK**

AT+CXXSN - Single-numbering parameterization

Some GSM network operators support single-numbering and some support multinumbering. You can determine which form of numbering is supported by your operator from whether your chip card has one number or more than one number at which it can be called for multiple voice or data services.

Example:

- You apply for the 9600 bit/s data and fax transmission services from your network operator and receive 2 telephone numbers with your chip card, one for when you wish to be called via the 9600 bit/s data service and one so that you can be reached via the fax service. This means that your network operator supports multinumbering.
- You have received only one telephone number for the 9600 bit/s data and fax services. This means that your network operator supports single-numbering. (Single-numbering is not supported in Germany.)
  When another party wishes to reach you, your telephone must decide which service will answer the call before it rings. If you set your GSM module to fax, all incoming calls will be answered by the FAX service.

AT+CXXSN	
Command	Result
AT+CXXSN	Displays the value currently set for +CXXSN.
AT+CXXSN=<SN mode>	Sets the single-numbering receive mode to the relevant mode.
AT+CXXSN=?	Displays a list of values for single-numbering receive modes.

AT+CXXSN=?	
Command	**AT+CXXSN=?**
Result code	**+CXXSN: <0,1,2>**
<SN mode>	Meaning of the mode
0	The next incoming call will be answered by the voice service (TS11).
1	The next incoming call will be answered by the voice/fax service. This is required if your network operator supports only TS61 and not TS62.
2	The next call will be answered by the fax or data service, depending on the active application on your PC. If a fax application is active, the module answers the call as a fax call.

Example:

You wish to set the SN mode to fax/data:

Enter: **AT+CXXSN=2**
GSM module: **OK**

AT+CXXMOC - Parameterize for outgoing calls

The following services are available for fax transmission in GSM:

- **Teleservice 61 (TS61) Combined voice and fax**
  This service exists as an imitation of combination fax machines and allows you to change from a voice connection to fax transmission.

- **Teleservice 62 (TS62) Automatic fax**
  This service is purely for faxing.

If your network operator supports only one of these services, you can use this command to configure your GSM module accordingly. You must do this in networks that support only TS61 if you are to be able to send or receive faxes at all.

AT+CXXMOC	
Command	Result
AT+ CXXMOC	Displays value currently set for + CXXMOC.
AT+ CXXMOC <MOC mode>	Sets the single-numbering receive mode to the relevant mode.
AT+ CXXMOC =?	Displays a list of values for MOC modes.

AT+ CXXMOC =?	
Command	**AT+CXXMOC=?**
Result code	**+CXXMOC: <0,1>**
<MOC mode>	Meaning of the mode
0	Fax calls to the radio network are set up using TS62.
1	All outgoing fax calls are set up using TS61 fax/ voice, but calls are terminated when the fax transmission is terminated.

Example:

You wish to set the MOC mode to TS61:

Enter: **AT+CXXMOC=1**
GSM module: **OK**

AT+CPBS - Select phonebook memory storage

When reading or writing a phonebook entry, you must tell the M1 which phonebook memory will be affected by the subsequent read/write jobs. The following phonebook memories are supported in the M1:

- Phonebook on the SIM card
- Last number redial memory
- Own telephone numbers
- FDN phonebook (if this is also supported by the SIM card)

AT+CPBS	
Command	Result
AT+ CPBS= dir.	Selects a new phonebook.
AT+ CPBS?	Provides you with information on which phonebook is currently activated.
AT+ CPBS=?	Displays a list of all the telephone directories supported.

AT+CPBS=?	
Command	**AT+CPBS=?**
Result code	**+CPBS: “MD“ , “SM“ , “OW“ , “FD“**
	Meaning
MD	Last number redial memory; displays the last telephone numbers that you dialed.
SM	SIM card; this is the standard phonebook containing the entries.
OW	Own telephone number; this phonebook contains your own telephone numbers under which you can be reached. Normally, you only need to read this directory since you cannot call your own number and it does not change.
FD	Fixed dialing number; this is a second phonebook. If the relevant block is set, only the numbers from this FDN phonebook can be called. This phonebook and the block are protected by PIN2.

AT+CPBR - Read phonebook entries

This command allows you to read the phonebook that was selected by means of the AT+CPBS command. You must also enter the number of the relevant position or a range of numbers.

AT+CPBR	
Command	Result
AT+CPBR=index1[,index2]	Reads the phonebook entry with the number index1. If you also enter a second index, reads the phonebook from index1 to index2.
AT+CPBR=?	Provides you with information on the maximum number of entries that can be contained in the directory and the maximum size of these entries.

The test command provides you with information on the format of the phonebook that was selected by means of AT+CPBS.

AT+CPBR=?	
Command	**AT+CPBR=?**
Result code	**+CPBR: <index>, <number length>, <text length>**
	Meaning
Index	Maximum number of entries in the phonebook
Number length	Length of a telephone number
Text length	Length of a telephone number name

AT+CPBW - Write phonebook entry

This command allows you to write an entry to the phonebook. You have the option of entering the telephone number with or without a name.

AT+CPBW= [index][,number, [type], [text]]	
	Meaning
Index	Stores the entry with the position number “index” in the phonebook. If you omit the index, an available position is sought; otherwise, the entry is written to the specified position, regardless of whether this position is already being used. If you specify only an index without a number or text, this means that you wish to delete the relevant entry.
Number	Number to be written to the phonebook
Type	International 145 Other 129 Type of number; can be omitted. If no type is specified, the type is automatically generated from the telephone number. A “+“ character at the beginning of the telephone number means that its type is international.
Text	Name to be stored with this number

AT+CBST - Select bearer service type

This command selects the bearer service with data rate and the connection element to be used when data calls are originated.

AT+CBST	
Command	Result
AT+CBST=[<speed> [,<name>[,<ce>]]]	Selects new speed, name and ce
AT+CBST?	Displays speed, name and ce
AT+CBST=?	Displays list of supported speed, list of supported name and list of supported ce (Connection Elements)

	<speed n>	n=[0,4,6,7,68,70,71]
0	autobauding	
4	2400 bps (V.22bis)	
6	4800 bps (V.32)	
7	9600 bps (V.32)	
68	2400 bps (V.110)	
70	4800 bps (V.110)	
71	9600 bps (V.110)	

	<name n>	n=[0]
0	asynchronous modem	

	<ce n>	n=[0]
0	transparent	

AT+CRC - Cellular result code

This command controls whether or not the extended format of incoming call indication is used. When enabled, an incoming call is indicated with unsolicited result code + CRING: <type> instead of the normal RING.

AT+CRC	
Command	Result
AT+CRC?	Displays mode n
AT+CRC=?	Displays a list of supported modes
AT+CRC=<mode n>	Selects a new mode

AT+CRC?	
Command	**AT+CRC?**
Rsult Code	**+CRC:** <mode n>
<mode n>	n=[0,1]
1	enables extendet format
0	disables extendet format
+CRING: <type>	
<type>	Meaning
ASYNC	asynchronous transparent
FAX	facsimile

AT+CLIP - Calling line identification presentation

This command refers to the GSM supplementary service CLIP (Calling Line Identification Presentation) that enables a called subscriber to get the calling line identity (CLI) when receiving a call.

The set command + CMP=<n> enables or disables the presentation of the CLI at the M1. It has no effect on the execution of the service CLIP in the network. When enabled +CLIP: <number>,<type> response is returned after every RING result code.

The read command +CLIP? gives the status of mode n and also triggers an interrogation of the provision status of CLIP in the network.

AT+CLIP	
Command	Result
AT+CLIP?	Displays mode n, mode m
AT+CLIP=?	Displays a list of supported modes n
AT+CLIP=<mode n>	Selects new mode

AT+CLIP?	
Command	**AT+CLIP?**
Result Code	**+CLIP:** <mode n>,<mode m>
<mode n>	n=[0,1]
1	enables extendet format
0	disables extendet format
<mode m>	m=[0,1,2]
0	CLIP not provisioned
1	CLIP provisioned
2	unknown

AT+CPAS - Phone activity status

This command returns the activity status of the GSM module M1 It can be used to interrogate the M1 before requesting action.

AT+CPAS	
Command	Result
AT+CPAS	Displays status
AT+CPAS=?	Displays a list of supported stati

AT+CPAS=?	
Command	**AT+CPAS=?**
Result Code	**+CPAS: 0 1 2 3 4 5**
0	ready
1	unavailable
2	unknown
3	ringing
4	call in progress
5	asleep

AT+FCLASS - Select mode

This command puts the M1 into a particular mode of operation (data, fax).

AT+FCLASS	
Command	Result
AT+FCLASS?	Displays mode n
AT+FCLASS=?	Displays a list of supported modes
AT+FCLASS=<mode n>	Selects new mode

AT+FCLASS?	
Command	**AT+FCLASS=?**
Result Code	0, 2
0	data
2	fax

Important

Example: The customer has a D2 card and uses M1 with the following default settings:

+FCLASS=0, B99, +CRC=0

When he receives a call (MTC), "RING" is displayed on his PC. The call can now be accepted by means of "ATA". The DSA in the M1 accepts the call as a data call proper irrespective of whether it is a data or fax call. The reason for this is that B99 causes the incoming service identifier to be ignored. With fax calls, this causes problems of many kinds because the user does not know which service is being used.

The command "AT+CRC=1" allows the M1 to also indicate the service identifier for incoming calls so that the user what service is being used.

To ensure that all units involved in the call accept the call in the proper manner, the user should select the correct service using AT+FCLASS before accepting the call.

.

AT+CXXCID - Card identification

Execution of this command displays the SIM number.

AT+CXXCID	
Command	Result
AT+CXXCID	Displays SIM number
AT+CXXCID=?	**OK**

AT+C commands for the short message service (SMS)

The module supports several of the AT+C commands specified in TS GSM 07.05 for using the short message service with the M1. In order to provide an application on the connected computer with complete information on the short messages, the M1 supports PDU mode. A PDU (protocol data unit) contains almost all the information relating to a short message that is transferred in the GSM network. For a more detailed description of the various PDUs, see TS GSM 03.40, which describes the implementation of the short message service.

The implementation of AT+C commands for SMS is based on TS GSM 07.05 Version 4.4.0.

AT+CSMS - Select message service

This command allows you to select the short message service.

Parameter command syntax

Command	Possible response(s)
+CSMS=<service>	+CSMS: <mt>,<mo>, <bm> +CSMS *ERROR* : <err>
+CSMS?	+CSMS: <service>,<mt>,<mo>, <bm>
+CSMS=?	+CSMS: (list of supported <service>s)

Values implemented

<service>:
0 GSM 03.40 and 03.41
<mt>,<mo>, <bm>
0 Type not supported
1 Type supported

AT+CPMS - Preferred message storage

This command allows you to select the memory to be used for read and write operations.

Parameter command syntax

Command	Possible response(s)
+CPMS=<mem1> [,<mem2>]	+CPMS: <used1>, <total1>, <used2>, <total2> +CMS *ERROR* : <err>
+CPMS?	+CPMS: <mem1>,<used1>,<total1>, <mem2>,<used2>,<total2>,
+CPMS=?	+CPMS: (list of supported <mem1>s), (list of supported <mem2>s)

Values implemented

<mem1> String type; memory from which messages are read and deleted
"SM" SIM message storage
<mem2> String type; memory to which commands are written and sent
"SM" SIM message storage
<total1> Integer type; total number of message locations in <mem1>
<total2> Integer type; total number of message locations in <mem2>
<used1> Integer type; number of messages currently in <mem1>
<used2> Integer type; number of messages currently in <mem2>

AT+CMGF - Message format

This command allows you to define the input and output format of the short message.

Parameter command syntax

Command	Possible response(s)
+CMGF=[<mode>]	
+CMGF?	+CMGF: <mode>
+CMGF=?	+CMGF: (list of supported <mode>s)

Values implemented

<mode>:
0 PDU mode

AT+CSCA - Service center address

This command allows you to set the SMSC address via which outgoing short messages are sent.

Parameter command syntax

Command	Possible response(s)
+CSCA=<sca>[,<tosca>]	
+CSCA?	+CSCA: <sca>,<tosca>
+CSCA=?	

<sca> GSM 04.11 RP SC address: Address value field in string format
<tosca> GSM 04.11 RP SC address: Type-of-address octet in integer format

AT+CMGR - Read message

This command allows you to display the short message addressed by <index>.

Action command syntax

Command	Possible response(s)
+CMGR= <index>	**If PDU mode (+CMGF=0) and command successful:** +CMGR: <stat>, <length><CR><LF><pdu> **Otherwise:** +CMS *ERROR* : <err>
+CMGR=?	

<index> Integer type; value in the range of location numbers supported by the associated memory

<stat> Integer type in PDU mode; indicates the status of message in memory.

0 Received, unread message (i.e. new message)
1 Received, read message
2 Stored, unsent message
3 Stored, sent message
4 All messages

AT+CMGS - Send message

This command allows you to send a short message from the TE to the network. If the short message is successfully sent, the message reference <mr> is returned to the TE.

Action command syntax

Command	Possible response(s)
If PDU mode (+CMGF=0): +CMGS= <length><CR>PDU is given<ctrl-Z/ESC>	**If send is successful:** +CMGS:<mr>, **If send fails:** +CMS *ERROR* : <err>
+CMGS=?	

<mr> GSM 03.40 TP message reference in integer format

AT+CMGW - Write message to memory

This command allows you to store a short message in the memory <mem2>. The memory location is returned in <index>.

Action command syntax

Command	Possible response(s)
If PDU mode (+CMGF=0): +CMGW= <length> [,<stat>]<CR>PDU *is given* <ctrl-Z/ESC>	+CMGW: <index>, +CMS *ERROR* : <err>
+CMGW=?	

AT+CMGD - Delete message

This command allows you to delete a short message from <mem1> at the location <index>.

Action command syntax

Command	Possible response(s)
+CMGD= <index>	+CMS *ERROR* : <err>
+CMGD=?	

AT+CNMI - New message indications

This command allows you to determine how the TE will be notified when a short message is received from the network, when the TE is activated.

Parameter Command Syntax

Command	Possible response(s)
+CNMI=[<mode>[,<mt>[,<bm>[,<ds>[,<bfr>]]]]]	+CMS *ERROR* : <err>
+CNMI?	+CNMI: <mode>,<bm>,<ds>, <bfr>
+CNMI=?	+CNMI: (list of supported <mode>s), (list of supported <mt>s) , (list of supported <bm>s) , (list of supported <ds>s) , (list of supported <bfr>s)

<ds> Sets result code indication routing for SMS-STATUS-REPORTS.
<bfr> Defines the handling method for buffered result codes when <mode> 1,2 or 3 is enabled.

AT+CMGL - List messages

This command allows you to display the short message with the status <stat> from memory <mem1>.

Action command syntax

Command	Possible response(s)
+CMGL=[<stat>]	**If PDU mode (+CMGF=0) and command successful:** +CMGL:<index>, <stat>, <length><CR><LF><pdu> [<CR><LF>+CMGL:<index>,<stat>,<length><CR><LF> <pdu>[....]] **Otherwise:** +CMS *ERROR* : <err>
+CMGL=?	+CMGL: (list of supported <stat>s)

AT+CMS ERROR - message service failure result codes

Value definitions

<err>	Values used by common messaging commands
0...127	Values from GSM 04.11 Annex E-2
128...255	Values from GSM 03.40, section 9.2.3.22
300	ME failure
301	SMS service of ME reserved
302	Operation not allowed
303	Operation not supported
304	Invalid PDU mode parameter
310	SIM not inserted
311	SIM PIN necessary
312	PH-SIM PIN necessary
313	SIM failure
314	SIM busy
315	SIM wrong
320	Memory failure
321	Invalid memory index
322	Memory full
330	SMSC address unknown
331	No network service
332	Network timeout
500	Unknown error

Fax operation conforming to TR-29.2

The GSM module functionally supports the following commands as per the future EIA/TIA 592 standard or acknowledges them with OK. For more information contact: EIAssociation, 2001 Eye Street, N. W., Washington, D. C. 20006, USA, Tel.: (1)-202-457-4900 and specify "PN 2388".

Commands and result codes: Prompts

AT+FDT= AT+FET= AT+FDR

Commands and result codes: Messages

AT+FDCS: AT+FDIS:AT+FDTC:AT+FCFR AT+FTSI:

AT+FCSI: AT+FCIG:AT+FHT:AT+FHR: AT+FCON

AT+FET: AT+FPTS:AT+FHNG:

Setting parameters

AT+FCLASS AT+FMFR?AT+FMDL?AT+FREV?

AT+FDCC= AT+FDIS=AT+FDCS=AT+FLID=

AT+FPTS= AT+FBUG=

Setting additional parameters

AT+FCR= AT+FAAAT+FBUF?AT+FBOR

The S-registers

The active configuration profile for the GSM M1 module is stored in S-registers. Each register is 8 bits long. A number of S-registers are reserved and must not be modified! The other registers can be read by means of the ATSn? command or overwritten using the ATSn= command. You can modify some S-register values using AT commands. This saves you from having to access the values directly in the S-register, i.e. you do not have to familiarize yourself with the actual values and meanings of the individual bit positions within the S-register. This section provides an overview of the S-registers. The factory configuration is printed in bold type.

ATSn? - Read an S-register

The ATSn? command allows you to read the "n"-th S-register. Parameter "n" must be an integer and designate an S-register.

Example:

Enter: **ATS0?**
GSM module: **003**
OK

Enter: **ATS0?S7?**
GSM module: **003**
030
OK

In response to the ATSn? command, the GSM module displays the register contents as a three-digit decimal number. If more than one register is read on one command line, the GSM module displays the register contents in the order in which the registers appear in the command string. The GSM module transmits a <CR> and <LF> character after each set of register contents is displayed. If the command syntax is incorrect, the GSM module returns ERROR.

ATSn=x - Write to an S-register

The ATSn=x command allows you to instruct your GSM module to store the value "x" in register "n". "n" and "x" must be integers and decimal numbers.

- n must designate an S-register.
- x must be from "0" to "255".

Example:

Enter: **ATS0=3**
GSM module: **OK**

This command sets register S0 to the value "3", i.e. the GSM module automatically answers a call after 3 ringing signals. The GSM module acknowledges the command with OK to indicate that the command was executed and a new command can be processed.

Binary and decimal values in S-registers

Although you enter values for S-registers as decimal numbers, like all other values that are stored in PCs they are stored in the registers in binary format:

Bit #	7	6	5	4	3	2	1	0
Binary	1	1	1	1	1	1	1	1
Decimal	128	64	32	16	8	4	2	1

The value of the register is obtained by adding together the values of all enabled bits. In the example, all bits are enabled ("1") and the result is the number 255. Since all bits can also be disabled ("0"), a total of 256 statuses can be stored in these 8 bit positions. This means that more than one parameter can be stored in one register.

Example:

Decimal	Binary
3	00000011
43	00101011
100	01100100

If a command applies only to bits 3, 4 and 5 of an S-registers, up to 8 different statuses can be defined:

Option	Bit 5	Bit 4	Bit 3	Dec.
0	0	0	0	0
1	0	0	1	8
2	0	1	0	16
3	0	1	1	24
4	1	0	0	32
5	1	0	1	40
6	1	1	0	48
7	1	1	1	56

Bit position registers

Registers in which a number of parameter values are stored are called bit position registers. If you wish to modify the parameter values in these registers directly, you must add up the decimal values of all the bits to be set and enter the result using the ATSn=x command. Since calculating such values is somewhat complicated, we recommend that you use AT commands to modify the values and do not write directly to the register. However, here is an example of how to do so:

Example:

S-register S22

Bit 7: Reserved, value is "0".
Bits 6, 5 and 4: Connection messages (ATXn command).
Bits 3 to 0: Reserved, value is "0".

You wish to enter the following parameter values:

Bit 7: Reserved, value is "0",
Isolated value: binary "0" = decimal "0",
Positioned value: binary "0 x x x x x x" = decimal "0".

Bits 6, 5 and 4: Extended connect message,
ignore busy signal (ATX2),
Isolated value: binary "0 1 0" = decimal "2",
Positioned value: binary "x 0 1 0 x x x" = decimal "32".

Bits 3 to 0: Reserved, value is "0",
Isolated value: binary "0 0 0 0" = decimal "0",
Positioned value: binary "x x x 0 0 0 0" = decimal "0".

Decimal input and binary storage:

Bit #	7	6	5	4	3	2	1	0
Binary	0	0	1	0	0	0	0	0
Decimal	(128)	(64)	32	(16)	(8)	(4)	(2)	(1)

Enter the decimal total for 0+0+32+0+0+0+0+0=32.

Command: ATS22=32

Overview of the S-registers

Please note:
The tables below do not include the reserved registers. Making entries in these unlisted, reserved registers can cause the GSM module to malfunction.

Sx	Meaning
S0	Number of ringing signals after which the system will answer automatically, i.e. the GSM module goes off-hook after the "n"-th ringing signal. Entering a value for n from "1" to "5" activates auto-answer. The maximum value is 5 ringing signals. The value "0" deactivates auto-answer. The factory setting is "0".
S1	Internal counter for ringing signals. Each incoming ringing signal increments the register contents by one. If the call was answered, the register is reset to "0" after a preset interval. This is a read-only register.
S2	ASCII value of the escape command characters. The factory setting for all countries is "43", which corresponds to the ASCII characters +++. S2 can be set to any value from "1" to "127". If "0" or a value greater than "127" is set, the escape command character is deleted. When the &D1, &D2 and &D3 options are enabled, the GSM module returns to command mode as soon as it detects that the level of the DTR signal has changed from ON to OFF.
S3	ASCII value of the <CR> character. The factory setting for all countries is "13". <CR> terminates command lines and initiates their execution, as well as terminating result codes. Permissible values are from "0" to "127".
S4	ASCII value of the <LF> character. The factory setting for all countries is "10". For long, alphanumeric result codes, <LF> is output after the <CR> character. Permissible values are from "0" to "127".
S5	ASCII value of the Backspace character. The factory setting is "8". Permissible values are from "33" to "127".
S7	Wait time for connection after dialing. If no connection is detected within the specified period of time, the GSM module goes on-hook. Permissible values are from "0" to "60".
S12	Wait time for AT commands in 50ths of a second. The period of time specified here must elapse before and after the escape sequence is entered so that the GSM module can recognize it as a command. The factory setting for all countries is "50" (= 1.0 s). Do not set too short of a wait time. Permissible values are from "0" to "255". As a rule, this value should be no less than "20".

S14: Command echo, result codes		
Bit	Options	Values
0	Reserved	0
1	Command echo (ATEn)	0 Echo off 1 Echo on
2	Result codes (ATQn)	0 Display result codes 1 Suppress result codes
3	Short format mode (ATVn)	0 Result codes as digits 1 Result codes as text
4	Reserved	0
5	Reserved	0
6	Reserved	0
7	Reserved	0

S21: DTR and DCD options		
Bit	Options	Values
0	Reserved	0
1	Automatic dialing when DTR OFF -> ON (At%Dn)	0 Automatic DTR dialing on 1 Automatic DTR dialing off
2	Reserved	0
3 4	DTR options (AT&Dn)	0 Ignore DTR 1 GSM module changes to command mode when it detects falling edge at DTR (ON -> OFF) 2 Same as 1 but also disconnects call. 3 GSM module is initialized when it detects falling edge at DTR (ON -> OFF)
5	DCD options (AT&Cn)	0 DCD always ON 1 DCD with valid carrier
6	Reserved	0
7	Reserved	0

S22: Result codes		
Bit	Options	Values
0	Reserved	0
1	Reserved	0
2	Reserved	0
3	Reserved	0
4 5 6	Result code options (ATXn)	0 Same as ATX0 1 Reserved 2 Reserved 3 Reserved 4 Same as ATX1 5 Same as ATX2 6 Same as ATX3 7 Same as ATX4
7	Reserved	0

S23: Bit rate and parity		
Bit	Options	Values
0	Reserved	0
1 2 3	Transfer rate at the COM interface	0 Reserved 1 Reserved 2 Reserved 3 2400 bit/s 4 4800 bit/s 5 9600 bit/s 6 19200 bit/s 7 Reserved
4 5	Parity	0 Reserved 1 None 2 Reserved 3 Reserved
6	Reserved	0
7	Reserved	0

AT&Tn - Test functions

Software test loops

If you can still address your GSM module with your communication program, check module functioning using the software test loops. Each test is initiated by means of an AT command. Be sure to perform the tests in the sequence described.

AT&T0 - Terminate an active test

You can terminate an active test at any time:

Step 1: Enter the escape command "+++." The GSM module switches to command mode.

Step 2: Enter the AT&T0 command. The test is terminated.

Any commands that follow the AT&T0 command on the command line are ignored.

AT&T1 - Initiate local digital test loop

This test loop checks your GSM module and the mobile telephone. If this test is not successfully completed, the problem is located in your GSM module or in a cable connection. Start the test loop and enter a random test message via the keyboard. The GSM module does not send this message to the distant station but, instead, receives it itself. It returns the message to the computer, where it is displayed on the screen. If the GSM module correctly echoes the test message to the computer, the module has successfully completed the local digital test.

Please note:
You can initiate this test only if no connection is set up; otherwise, the GSM module returns **ERROR**.

Situation: Command mode, no connection.

Example:

Enter: **AT&T1**
GSM module: **OK**

Enter: **ABC**
GSM module: **ABC**

You can enter additional test data and check the echo.

Terminate this test by entering the following:

Enter:	**+++**	Escape command
GSM module:	**OK**	Acknowledges escape command
Enter:	**AT&T0**	Terminate test.
GSM module:	**OK**	Test terminated.

ATIn - Display GSM module I-data

The ATIn command provides you with information that you should keep ready in case you need to consult your dealer or the manufacturer.

ATIn [n=0,1,2,8,9]	
Option	Result
ATI0	Displays GSM module product code. The GSM module transmits the product code as a 3-digit ASCII string with the format 24x followed by <CR> and <LF>.
ATI1	Displays firmware checksum. The GSM module transmits 3 numeric ASCII characters followed by <CR> and <LF>.
ATI2	Checks firmware checksums. As the result, the GSM module returns the OK or ERROR result code followed by <CR> and <LF>.
ATI8	Displays GSM module's operating modes: 7 GSM 2400 bit/s duplex asynchronous transparent (V.22bis) 11 GSM 4800 bit/s duplex asynchronous transparent (V.32) 13 GSM 9600 bit/s duplex asynchronous transparent (V.32) 25 GSM 2400 bit/s asynchronous transparent (V.110 ISDN) 27 GSM 4800 bit/s asynchronous transparent (V.110 ISDN) 29 GSM 9600 bit/s asynchronous transparent (V.110 ISDN) 70 GSM Fax transparent, 2400/4800/7200/9600 bit/s (G3) 99 Automatically adapts to PC baud rate
ATI9	Displays GSM module's version ID. The GSM module transmits its ID.

Technical data

General

Type:	M1
Housing:	Plastic
Dimensions:	116 x 67 x 30 mm
Weight:	157 g
Memory:	Flash EPROM
Input voltage:	+8 V to +24 V DC
Nominal voltage:	13,2 V DC
Input current:	Max. 500 mA
Class of protection:	III
Temperature range:	-20 °C to +55 °C (operating)
	-40 °C to +70 °C (storage)

V.24 interface

Connector: 9-pin DSUB (female) to DIN 41652

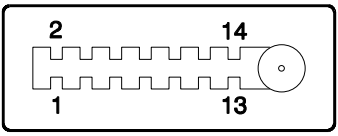
Pin assignment:

PIN	DIN	EIA	CCITT	Designation
1	M5	DCD	109	Data Carrier Detect
2	D2	RX	104	Receive Data (out)
3	D1	TD	103	Transmit Data (in)
4	S1.2	DTR	108.2	Data Terminal Ready
5	E2	–	102	Signal Ground
6	M1	DSR	107	Data Set Ready
7	S2	RTS	105	Request To Send
8	M2	CTS	106	Clear To Send
9	M3	RI	125	Ring Indicator

Logic:	V.24 asynchronous
Baud rates:	2400 - 19200 baud, autobauding
Parity:	None
Character format:	8 data bits
Stop bits:	1
Level:	To CCITT Recommendation V.28

Hybrid connector (manufacturer-specific)

Pin assignment:



Meaning of pins:

PIN	Name	Used	Meaning
1	Power	X	8 V - 24 V DC
2			Reserved
3	BF-Bus		Reserved
4	NF Ext		Reserved
5	TX_E		Reserved
6	RX_E		Reserved
7	Ignition	X	Activate/deactivate 0 - 24 V
8	Antenna Ext		Reserved
9	AUDO_1		Reserved
10	AUDO_2		Reserved
11	HF_MICRO		Reserved
12	GNDA		Reserved
13	GND	X	Ground
14	GND		Ground

Antenna: Impedance 50 ohms

GSM modes

Fax

CCITT Rec.:	CCITT T.30, T.4
Routes:	MOC and MTC
Info.transf.mode:	FAX G3
Clock mode:	Synchronous
Connection elem.:	Transparent
Structure:	Unstructured
Radio channel:	Full rate
Intermed. rate:	8 or 16 kbit/s
User rate:	2400, 4800 or 9600 bit/s
Teleservice:	TS 61, TS 62

Data

GSM Rec.:	GSM 7.01, 7.02, 4.21
Routes:	MOC and MTC
Info.transf.mode:	3.1 Khz audio ex PLMN (analog) or UDI/V.110 (ISDN)
Clock mode:	Asynchronous
Connection elem.:	Transparent
Structure:	Unstructured
Layer 2 protocol:	NAV
Data bits:	8
Parity bits:	None
Bits/char.	Always 10 bits/char.
Stop bits:	1
Radio channel:	Full rate
Intermed. rate:	8 or 16 kbit/s
User rate:	2400, 4800 or 9600 bit/s
Modem type:	V.22bis, V.32
Bearer service:	BS 24, BS 25, BS 26

SMS

GSM Rec.:	GSM 03.40, 07.05
Routes:	SMS MO and MT
Mode:	PDU mode
Teleservice:	TS22, TS21

GSM documentation

GSM reference documents

The following GSM reference documents are recommended:

GSM 03.40
GSM 03.45
GSM 04.11
GSM 04.21
GSM 05.08
GSM 07.01
GSM 07.02
GSM 07.05
GSM 07.07

ETSI contact

The Technical Specifications can be ordered from the following address:

European Telecommunications Standards Institute

ETSI Secretariat

Postal Address:	F-06921 Sophia Antipolis CEDEX - FRANCE
Office Address:	650 Route des Lucioles - Sophia Antipolis - Valbonne - FRANCE
X.400:	c=fr, a=atlas, p=etsi, s=secretariat
Internet:	secretariat@etsi.fr
Tel.:	+33 92 94 42 00 - Fax: +33 93 65 47 16

CE-Sign

The GSM Module M1 with its IMEI number is approved for operation in GSM networks.

This device also conforms to the following EU guidelines:

CE
– 89/336/EWG “Electromagnetic Compatibility”
– 91/263/EWG CTR5 and CTR 9
– ETS 300342-1

as confirmed by the CE mark.

Service

The current version of this manual and of the M1 software can be found in the following mailbox:

Mailbox telephone number: +49 89 722 46555

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