DYNACORD®

Operator's Manual

Modem DC 56 K

Restriction of warranty

This handbook contains a as concise as possible description of the modem. Whilst every care has been taken in compiling the text, errors can not be completely ruled out. No guarantee can therefore be given for the accuracy of the contents. We accept no legal or other liability for incorrect information given and any consequences thereof. Suggestions for improvements and notification of errors are gladly accepted.

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1 Introduction

This manual serves as a basis for operating the modem type DC 56 K from EVI Audio GmbH.

1.1 Scope of Delivery

Before installation and operation please check that the box contains all of the following parts:

DC 56K	
1x	Device
1x	TAE cable
1x	RS232 cable (9 pin plug / 9 pin jack)
1x	Power supply 9...10 V DC
1x	User's Manual

If the content is incomplete, please contact your supplier. Please also inspect the modem for transport damage and in the event of damage, consult your supplier.

Please keep packaging for future dispatch or storage.

1.2 General

You have some advantages with the analogue desktop devices of EVI Audio and you can not think about the past without this unit. The Modems support the following functions, which are described in detail in the following:

- Password request at connection set-up
- Remote configuration after escape sequence and password entry
- Security Callback to definable phone number
- SMS dispatch via AT command

Both desktop devices described in this manual differ from each other in the following features:

DC 56K	
Dimensions in mm (b x l x h)	71 x 128 x 22
Status display	2 LEDs
RS232 interface	SubD9F
Power supply	9...10 V DC
Data rate	up to 56 kbps
Functions:	-
Miscellaneous:	-

2. Technical Data

2.1 Mechanical Features

DC 56K	
Weight:	150 g
Dimensions in mm (b x l x h)	71 x 128 x 22
Temperature range:	0°C ... 55°C
Protection class:	Housing IP40 / Terminal IP 20
Humidity:	0 – 95 % not condensing

Note: The DC 56K may not be used in wet environments.

2.2 Interfaces and Display Elements

2.2.1 DC 56K

front view

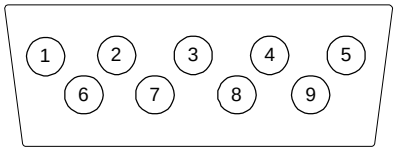
The DC 56K has two LEDs for status display.

These have the following importance:

Importance	Color	Description
Power	green	On, when power supply exists.
Off Hook	red	On, when modem is off hook (this makes line busy!)

2.3 Serial Interface

Layout of the 9 pin D-Sub jack



9 pin D-Sub jack

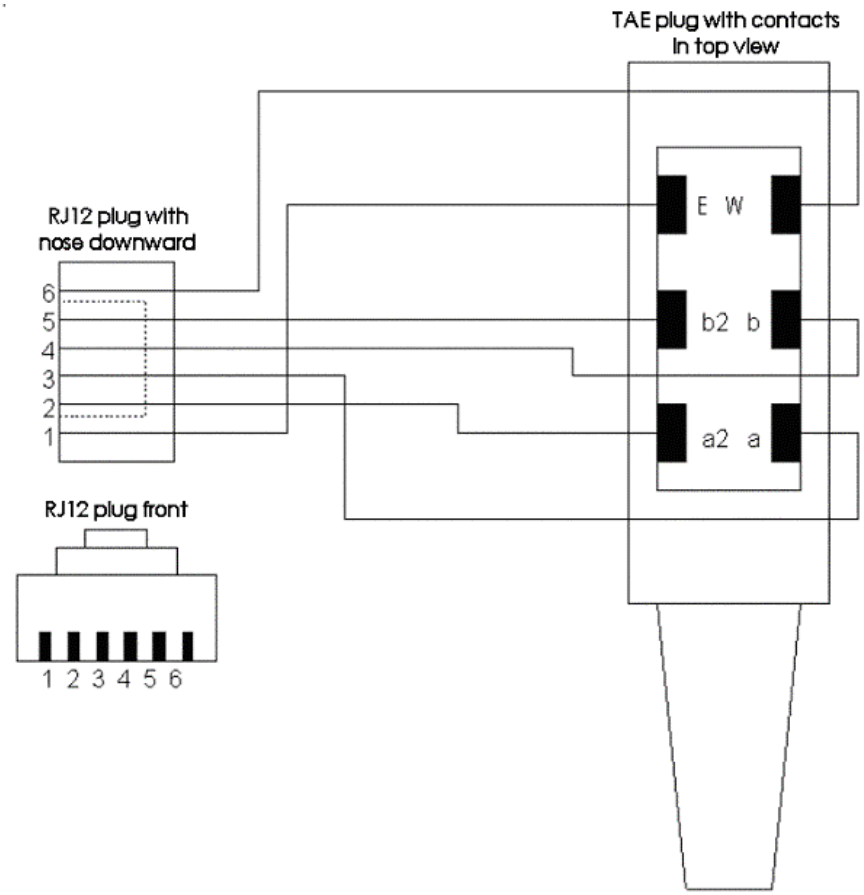
Description of the signals at the 9 pin D-SUB jack of the DCE:

9 pin D-SUB DCE Pin No.	Description	Function	CCITT V-24	EIA RS232	DIN 66020	E/A DCE to DTE
1	DCD	Data Carrier Detect	109	CF	M5	O
2	RXD	Receive Data	104	BB	D2	O
3	TXD	Transmit Data	103	BA	D1	I
4	DTR	Data Terminal Ready	108	CD	S1	I
5	GND	Ground	102	AB	E2	
6	DSR	Data Set Ready	107	CC	M1	O
7	RTS	Request To Send	105	CA	S2	I
8	CTS	Clear To Send	106	CB	M2	O
9	RI	Ring Indication	125	CE	M3	O

Interface speeds of the DC 56K:

Baudrate in bps
300
600
1.200
2.400
4.800
9.600
14.400
19.200
28.800
38.400
57.600
115.200

2.4 Phone Interface



Layout of the Western plug and the RJ 45 jack

Pin	Description
1	NC
2	E
3	LA1
4	LA
5	LB
6	LB1
7	W
8	NC

2.5 Transmission Standards / Protocols

DC 56k	
V.21	yes
V.22A/B	yes
V.22bis	yes
V.23 V.23 half-duplex	yes no
V.32bis	yes
V.34	yes
V.34+	yes
V.90	yes
56k flex	yes
Bell 212A and 103	yes
V.29	yes
V.27ter	yes
V.21 channel 2	yes
V.17	yes
Fax Group 3 send/receive	up to 14.400 bps
Fax Class 1 command set	yes
Fax Class 2 command set	yes
V.42LAP-M error correction	yes
MNP 2-4 error correction	yes
MNP 10 error correction	yes
V.42bis data compression	yes
MNP 5 data compression	yes
Voice functions	yes
ASVD	no
Remote Control	yes
Automatic callback	yes

2.6 ITU Standards (CCITT)

Bps represents the number of transmitted bits per second. Duplex is simultaneous transmission in both directions

ITU standard (CCITT)	Importance
V.21	Transmission with 300 bps duplex.
V.23	Send with 75 bps and receive with 1.200 bps or reverse.
V.23 Half-duplex	Send and receive with 1.200 bps.
V.22	Transmission with 1.200 bps duplex.
V.22bis	Transmission with 2.400 bps duplex.
V.32	Transmission with 9.600 bps or (fallback) 7.200, 4.800 bps.
V.32bis	Transmission with 14.400 bps or (fallback) 12.000, 9.600, 7.200, 4.800 bps.
V.FC	Transmission with 28.800 bps or (fallback) 26.400, 24.000, 21.600, 19.200, 16.800, 14.400 bps.
V.34	Transmission with 28.800 bps or (fallback) 26.400, 24.000, 21.600, 19.200, 16.800, 14.400 bps.
V.34+	Transmission with 33.600 bps or (fallback) 31.200, 28.800, 26.400, 24.000, 21.600, 19.200, 16.800, 14.400 bps.
K56flex	Transmission with 56.000 bps or (fallback) 54.000, 52.000, 50.000, 48.000, 46.000, 44.000, 42.000, 40.000, 38.000, 36.000, 34.000, 32.000 bps.
V.42	Error protection method for DCEs with asynchronous-synchronous-conversion
V.42bis	Data compression method
V.25bis	Alternative command set to AT command set
V.90	Transmission with 56.000 bps or 54.667, 53.333, 52.000, 50.667, 49.333, 48.000, 46.667, 45.333, 42.667, 41.333, 40.000, 38.667, 37.333, 36.000, 34.667, 33.333, 32.000, 30.667, 29.333, 28.000 bps.

(bis = french: second) = extended

3 Start-Up

3.1 Installation Steps

On the back of the external modems you find three terminals:

- The power supply jack
- The phone line jack
- The 9 pin jack for the connection with the serial interface of your computer.

Please proceed as follows for starting-up the external version:

1. Connecting the power supply
   Connect the delivered power supply plug into the modem and then the mains adapter plug into the wall socket. If you switch on the modem now, the **POW** LED has to be on.

   Important Note: Using a different mains adapter may result a damage of the modem; the manufacturer can not take any liability for this.

2. Connecting the PC
   Connect the 9 pin jack at the modem with the serial interface of your computer.

3. Now, start the terminal program at your PC and set it to the used COM interface. The modem adapts automatically to the baudrate of your PC.

4. Connecting to phone network
   Now, connect the delivered phone cable to the jack at the back of the modem. The plug of the cable has to snap-in.

   Connect the other side of the phone cable into the phone socket. When connecting the modem to older phone sockets, it may be necessary that you have to buy an adapter in a phone accessories store or request the installation of a multiple TAE/N socket from your phone network provider.

5. Test of a successful installation:

   The short test takes place via your terminal program (TeraTermPro, ProComPlus). Enter the command **AT** and press „Enter". If the message **OK** appears at your screen then, the device is installed successful.

6. Connection test:

   - Set up a connection either to another modem OR like in this example to Freenet
   - Dial with ATD the following number 0101901929 (**ATD0101901929**)

Attention: For PABXs, which require a „0“ for connection set-up, please enter **ATX3DT0,0101901929**

- OFF Hook LED is on
- Modem dials
- After some time (max. 1 min.) the **CONNECT** message appears
- Freenet tries to establish a contact now
- The connection will be terminated after max. 1 minute

7. Driver installation

   When using the modem under operating system Windows 95/98, a corresponding standard driver has to be selected. For this refer to the menu entry *Start – Settings – Control Panel* and select *Modem*.

3.2 Optimizing the Modem Connection

In most of the cases, you can leave the connection set-up to the automatic functions of the modem.

If you have a look at the settings with the AT command **AT+MS?**, you get e.g. **56, 1, 300, 56.000, 0, 0, 33.600**.

This means that a connection between 300 and 33.600 bps, preferably according to V.90 will be established, depending on the line quality and the abilities of the partner modem.

Importance of AT%Q and AT%L

You can request a value for quality with **AT%Q**, and a value for the receive level with **AT%L** for an existing connection.

In case of an existing connection, you have to change the modem to command mode before with **+++**.

Quality values between 0 and 10 are good. For values above 50, the modem will reduce the data rate (for automatic setting) automatically.

4. Functions

4.1 Settings

The modem knows three different setting sets:

- Factory setting
- User setting 0
- User setting 1

The user can store configurations in the user settings 0 and 1, which he wants to use for certain purposes in future again.

Each setting stores a part of the S registers. The registers concerned are marked with a *) in the description of the S registers.

4.1.1 Factory Settings

With the factory setting you are able to achieve a defined initial state of the modem. From this "basis", you can adapt the modem according to your requirements. If the modem is completely misadjusted some time, loading the factory settings enables you to restore a ready to run state without any problems. The factory settings of your modem type can be displayed in your terminal program with the AT command **AT&F&V**. Here is the example of a type 56k:

```
at&v

ACTIVE PROFILE

B0 E1 L1 M1 N1 Q0 T V1 W0 X3 Y0 &C1 &D2 &G0 &J0 &K3 &Q5 &R1
&S0 &T5 &X0 &Y0

S00:000  S01:000  S02:043  S03:013  S04:010  S05:008  S06:003
S07:060  S08:002  S09:006  S10:020  S11:095  S12:050  S18:000
S25:005  S26:001  S36:007  S37:000  S38:020  S46:138  S48:007
S95:047

STORED PROFILE 0:

B0 E1 L1 M1 N1 Q0 T V1 W0 X4 Y0 &C1 &D2 &G0 &J0 &K3 &Q5 &R1
&S0 &T5 &X0

S00:000  S02:043  S06:003  S07:060  S08:002  S09:006  S10:020
S11:095  S12:050  S18:000  S36:007  S37:000  S40:104  S41:195
S46:138 S95:047

STORED PROFILE 1:

B0 E1 L1 M1 N1 Q0 T V1 W0 X4 Y0 &C1 &D2 &G0 &J0 &K3 &Q5 &R1
&S0 &T5 &X0
```

```
S00:000   S02:043   S06:003   S07:060   S08:002   S09:006   S10:020
S11:095   S12:050   S18:000   S36:007   S37:000   S40:168   S41:195
S46:138 S95:000

TELEPHONE NUMBERS:

          0=                  1=

          2=                  3=
```

The factory settings of your modem may differ from the shown setting for technical reasons.

4.1.2 Storing the Current Configuration Into A User Setting

If the modem has been adjusted for specific user requirements, it is possible to save this setting in user configuration 0 or 1 by using the commands **AT&W0** or **AT&W1** respectively. These settings are then automatically loaded as the current modem configuration at the next reset. For a user configuration 0 or 1 to be loaded on a hardware reset, depends upon whether a command **AT&Y0** or **AT&Y1** respectively has been previously given.

A software reset **ATZ** or **ATZ0** command results loading the user setting 0, an **ATZ1** command results loading the user setting 1.

4.1.3 Restoring the Initial Delivery State

AT&F Restoring the initial delivery state
If the modem is to be reset to delivery state, the factory setting has to be loaded to the current modem configuration first. This takes place with the command **AT&F**.

AT&W0 Then, the current modem configuration will be transferred to the current user setting 0 with the command **AT&W0**.

AT&W1 corresponds with user setting 1.

AT&Y0 An **AT&Y0** command results finally that the user setting 0 (now identically with the factory setting) is loaded to the current modem configuration for every following hardware reset.

AT&Y1 corresponds with user setting 1.

ATZ A software reset is executed.

4.2 Reset

There are two types of resets, hardware reset and software reset:

- A hardware reset takes place when connecting the power supply or performing a warm/cold start at the PC.
- A software reset is performed with the command **ATZ**.

Both possibilities of the reset result that a complete test of the modem hardware is performed (duration approx. three seconds). During this time, some control LEDs light up.

- In case of a **hardware reset** (switching on, RESET key or start of the PC for plug-in board), a user setting is loaded to the current modem configuration. It depends on an eventually preceding **AT&Y** command, whether user setting 0 (**AT&Y0**) or user setting 1 is loaded (**AT&Y1**).
- In case of a **software reset** the user setting 0 or 1 is taken over to the current modem configuration. **ATZ** and **ATZ0** result loading the user setting 0, **ATZ1** result loading the user setting 1.

4.3 Error Correction and Data Compression

The Modems support the V.42 error correction protocol, including Microcom Networking Protocol (MNP) Levels 2/3/4 (MNP2, MNP3, MNP4), and data throughput optimization MNP10.

4.3.1 Error Correction

4.3.1.1 V.42 Error Correction

V.42 error correction contains the LAP-M and MNP4 protocols. LAP-M is the preferred error correction. (Link Access Procedure for Modems)

MNP4 is supported for reasons of compatibility with other MNP modems. Both methods lay frames around the actual data to be transmitted and employ CRC (Cyclic Redundancy Check) 16 checksums for error checking.

In V.42 the possibility exists, to make the modem detect, whether the partner is a V.42 modem, an MNP modem, or a modem without error correction. Then, the modem can adapt to the partner independently.

(See chapter 8 "AT command set", command **AT\N**.)

4.3.1.2 MNP 2/3/4 Error Correction

MNP error correction can either be operated in block or stream mode. In stream mode the maximum block size can be set to 64, 128, 192 or 256 bytes.

(See chapter 8 "AT command set", command **AT\A**.)

The MNP error correction can be either used automatically or activated with AT-commands.

(See chapter 8 "AT command set", command **AT\N**.)

4.3.2 Data Compression

The modem detects automatically, depending on the **AT%C** command, the type of data compression, the remote modem is using, or it can be set to specific type of compression or no compression.

Data compression is only possible for error corrected connections.

The use of data compression assumes that the remote modem supports the same data compression mode.

4.3.2.1 V.42bis Data Compression

V.42bis data compression can only operate on a V.42 connection (LAP-M or MNP4). For data compression V.42bis first compiles a so-called dictionary with often-used character sequences. Then subsequently only markers for these sequences are sent to the receiving modem, not the complete character sequences.

Packed data can not be packed again by V.42bis.

4.3.2.2 MNP 5 Data Compression

The modem supports Microcom Networking Protocol Level 5 data compression. MNP5 data compression can only be used on an error corrected MNP4 connection. MNP5 replaces often used characters with shorter “tokens”.

Packed data can not be packed again by MNP5.

4.4 Dialing Delay

Only valid for devices with BZT approval.

According to the regulations of Deutsche Telekom, any further dialing is locked after 12 unsuccessful dialing attempts. The modem has to be switched off for a moment in this case. After a successful dialing attempt, the counter is reset automatically.

If the connection is established, a dialing pause of 5 seconds will be made.

4.5 Flash Update

This function enables a software update of the modem without changing the EPROM. You receive the new software from your service partner if necessary.

Requirements:

A PC and a terminal program are required for the flash loading function. The terminal program must be capable of conducting an ASCII upload (ASCII data transmit protocol). It is necessary to set hard flow control. Also any interpretation of characters by the ASCII upload protocol must be switched off (e.g., interpretation of TAB, CR, BS...).

The baudrate must be set between 9.600 baud and 57.600 baud. Any other baudrates can cause errors or damages. Loading lasts approximately 2-3 minutes with a baudrate of 57.600 baud, longer with lower baudrates.

Activation and process:
The flash load function is started with the command **AT****.

The modem reports **"Download initiated"**. The ASCII upload of the flash load program HS_LADER.S37 (is delivered together with the firmware file for the upload) is now conducted. The progression of the transmission is indicated by dots on the monitor screen. When the loading process is complete the message **"Download Flashcode"** appears. Now a new ASCII upload is initiated with the firmware file (xxxxxxxx.S37). From this moment onwards the transmission must not be interrupted because this would mean that flash EPROM has been fully deleted but not completely reloaded. The progression of this upload process is also indicated by dots.

Checking the success:

When the process is complete the message **"Device successfully programmed"** appears. With this the flash upload is finished.

AT commands for the flash loading function:

Command	Description
AT**	Starting the flash loading function

Note:

When using Telix, set the time delay between signs and lines for the ASCII protocol to „0". Furthermore switch off the local echo.

4.6 Remote Configuration

4.6.1 Functionality

To change into remote configuration mode a data connection must exist between the modems. A specific protocol is not recommended, however it is recommended to use an error corrected connection to avoid transmission errors with the commands.

It isn't necessary that the local modem has a remote configuration function.

Modem 1 ---------- Modem 2

(local modem) (remote modem)

4.6.2 Starting the Remote Configuration

Remote configuration is started by entering the sequence ******** (four asterisks), with at least 1 second break in the data stream in front of and after the ******** sequence. The remote initial character can be changed with **S17**.

4.6.3 Proceeding of a Remote Process

If the remote modem is opened for remote configuration (**AT*R1**), it reports with the request for the password. (Default is QWERTY). If the entered password and the password stored in the remote modem with the command **AT*C** are equal, the remote modem sends the prompt "**>**''. Now commands can be sent to the remote modem in the same way as it is a local modem.

4.6.4 Reduced Command Set during Remote Configuration

Some commands can not be executed during remote configuration and lead to a return message **ERROR** (**ATA, ATD, ATO, AT/B, AT*C, AT&F**).

If the entered password is wrong, the modems went back to the data transmission mode.

4.6.5 Terminating the Remote Configuration Process

The commands **AT*E**, **AT*X** or **ATZ** can be used to terminate the remote configuration. The 3 commands have the same function. With **ATZ**, the remote modem executes a software reset and interrupts the connection with this. All entered commands, which have not been saved with **AT&W** before, are deleted and the modem loads the user configuration 1.

For the new devices:

The remote configuration can be finished with the commands **AT*E** und **AT*X**, so the modem goes back to data transmission mode. **ATZ** starts a software reset.

4.7 Security Callback

The feature security callback is used for a callback of the called modem to a predefined number.

This function is executed after entering a password and is a safe protection for unauthorized access.

4.7.1 Functionality

Activation:

Save the callback number in the register of phone numbers of the remote modem (place 1, with the standard AT command **AT&Z1**).

Incoming call:

When the modem answers an incoming call (**ATS0** <> 0 is set, or acceptance with **ATA**), approximately 2 seconds after the message **"CONNECT"**, you will see the message **"SECURITY CALLBACK"** und **"REMOTE PASSWORD:"**. Now the Remote Password must be entered (the security callback password is identical with the remote access password, that means it is entered with the command **AT*C**).

Wrong password entry:

The modem immediately disconnects the connection and stops a forbidden access to the attached device.

Correct password entry:

The modem reports **"OK"** to the calling terminal, disconnects the connection and dials the phone number stored with the command **AT&Z1** after approx. 10 seconds. 3 call attempts are executed at all, each with 10 seconds break between this.

Data connection:

If the connect takes place, approx. 2 seconds after the Connect the callback modem reports **"CALLBACK IN PROGRESS"** and the serial interface is opened. Now a normal data connection exists.

Outgoing data connections:

Security-callback-modem initiated connections with **ATD** are not influenced by the security callback function.

Deactivation:

Deactivation of the callback function is made by deleting the return phone number with the command **"AT&Z1="**.

AT commands for the security callback:

Command	Description
AT*C	Set the password in the callback modem
AT&Z1=xxx	Enter the callback no. in the callback modem (xxx stands for the phone no.)

4.8 Password for Connection Set-Up

If the password request is switched on with **AT*P1**, the password request takes place after the **CONNECT** message. After entering the password correctly, the actual connection is established and data can be transferred.

If an incorrect password has been entered, the modem hangs up. The password is the same as for remote control and set with **AT*C**.

4.9 SMS Functionality

Short description:

The modem can not only send the alarm message to another analogue modem, but also as SMS to a mobile phone. At the moment only D1, D2, and E network phones are supported.

Proceeding of the SMS dispatch:

The text is entered with the command **AT*V** the usual way. The maximum length of the alarm text is 160 characters.

To send the message to a mobile phone the following settings must be made, depending on your provider:

D1 network:
AT*M1
AT&Z0=01712521002
AT&Z2=number of the mobile phone in the format 49171xxxxx

D2 network:
AT*M4
AT&Z0=01722278000
AT&Z2= number of the mobile phone in the format 0172xxxx

E network:
AT*M1
AT&Z0=01771167
AT&Z2= number of the mobile phone in the format 49177xxxx

AT commands for the SMS dispatch:

Command	Description
AT&Z0	Sets the service center number of the mobile phone provider. The numbers given here assume that no outside line has to be accessed. When using a PABX, the number must be completed with the according access sequence.
AT&Z2	Defines the number of the mobile phone to which the SMS will be sent. The different network providers support, like shown above, different formats for transmitting the phone number.
AT*Mn	Defines the protocol for sending the alarm string to the network provider.
AT*M0	Sets a standard analogue modem as remote terminal (alarm function so far).

AT*M1	Sets D1 or E network as remote terminal.
AT*M4	Sets D2 network as remote terminal.
AT*V	Enters the alarm text (max. 160 characters).
AT%A	Triggers the alarm function, text message or SMS.
S13	Sets the number of dialing attempts in case of alarm.

4.10 Serial Data Transmission

4.10.1 Automatic Baudrate Detection

The modem detects the baudrate of the connected PC from the AT characters preceding every command. This is also known as DTE or interface speed, that is the speed between the modem and the computer. The modem can communicate with the baudrates (according to type) 300, 600, 1.200, 2.400, 4.800, 9.600, 19.200, 38.400, 57.600, 115.200 and 230.400 bps with the PC.

The adaptation to the transmission speed of the phone line takes place automatically as well, if not set differently. (See chapter 8 "AT command set").

Here both modems try to achieve the highest speed at the phone line ***together*** at connection set-up.

- Possible speeds at the phone line data transmission (up to four times as much by data compression!):

  DC 56k 300 to 56.000

- Possible speeds at the phone line for fax transmission: 2.300, 2.400, 4.800, 7.200, 9.600 and 14.400 bps. The baudrate to the PC is for fax transmissions always 19.200 bps.

4.10.2 Data Buffering for Serial Data Transmission

The modem provides fast send and receive intermediate memory (so-called buffers), in order to match the modem to the PC's processing speed. It is possible to deactivate this data buffering with the **AT\N1** command and revert to direct mode.

When working with buffers, handshaking has to be used, because otherwise a overflow of the modem buffer may occur which leads to data transmission failures.

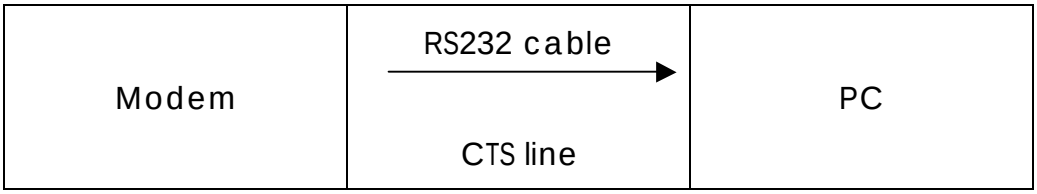
4.10.3 Direct Mode

In this mode, eleven bits are sent. They consist of eight data bits, a parity bit, a start bit and a stop bit. Direct mode is activated by the command **AT\N1**. The modem has no influence in direct mode on the transmission format. Data is transferred without buffering.

Data compression or error correction does not function in direct mode. Only the disconnect sequence is recognized by the modem (**+++** preset).

4.10.4 Hardware Data Flow Control with RTS/CTS (CT133/CT106)

Hardware data flow control via the mode (CTS)

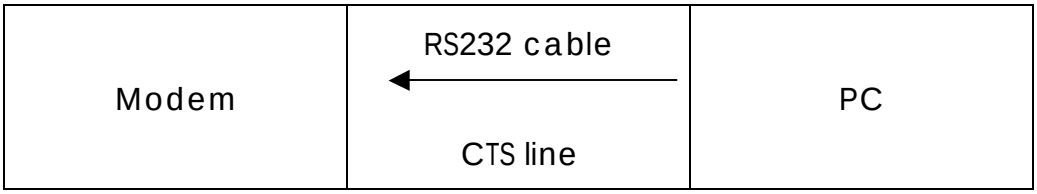


If the input buffer of the modem exceeds a certain XOFF fill state, the modem sets the CTS line to OFF. This indicates the PC that he shall send no data anymore.

Note: The CTS line is only served by the modem when the commands **AT&K** or **AT&R** are executed accordingly.

After the modem has worked off the input buffer so far that it falls below a certain buffer XON fill state, it sets the CTS line back to ON and indicates the PC that is ready to receive data again.

Hardware data flow control via the PC (RTS)

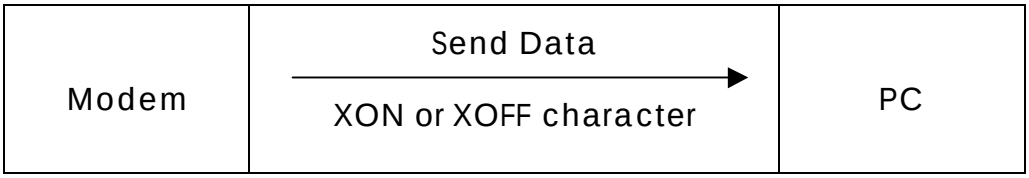


The PC sets the RTS line to OFF to request the modem to interrupt the data transmission.

Note: It depends on the respective software of the PC, whether the RTS/CTS lines are served from the PC.

- The PC sets the RTS line to ON to request data from the modem.
- In depends on the setting of the modem with the commands **AT&K** or **AT&R**, whether the RTS/CTS lines are served from the modem.

4.10.5 Software Data Flow Control With The ASCII Control Characters XON And XOFF (CHR(17) And CHR(19))



When the input buffer of the modem has exceeded a predetermined XOFF fill level, the modem inserts an XOFF character into the data stream to the connected device. This character causes the connected device to stop sending data.

Note: Support of XON/XOFF flow control by the modem depends on the setting of the command **AT&K**.

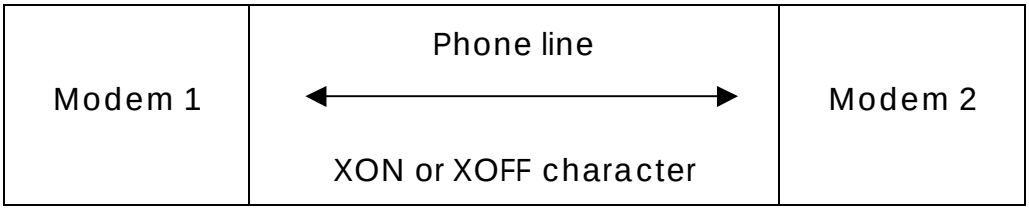
Support of XON/XOFF flow control by the PC depends on the software currently running on the PC.

Once the modem has processed the contents of the buffer such, that it falls below a predetermined XON fill level, the modem includes the XON character in the data stream. This character causes the connected device to start sending data again to the modem. In a similar manner, the connected device can control the data flow from the modem to the connected device.

The XON/XOFF process is only possible if the XON or XOFF characters are not present in the transmitted data, as a rule only for ASCII texts. When transmitting programs, e.g. using XMODEM transmission protocol, any XON or XOFF characters appearing randomly, would interrupt operation.

4.10.6 Data Flow Control between Modems

Software data flow control between two modems for non-error corrected data transmission (without V.42 or MNP4).



For non-error corrected data transmission (V.42 and MNP4 inactive), one modem can interrupt the other by inserting a XOFF character into the data stream when the XON/XOFF protocol is activated by the command **AT\G1**.

New data can be requested by inserting a XON character into the data stream.

The XON/XOFF characters are inserted depending on the fill state of the modem buffer.

Normally, the XON/XOFF characters received from the other modem are evaluated by the modem and not forwarded to the PC. However, there is the possibility to evaluate XON/XOFF characters received from the other modem and to forward them transparently to the PC. (For this see chapter 8 "AT command set, command **AT&K**). Errors may occur when data contains the characters for XON and/or XOFF accidentally. This is only impossible when pure text files are transferred.

4.10.7 Software Data Flow Control Between Two Modems With Error Corrected Data Transmission (V.42, MNP4)

Error corrected data transmissions (V.42 or MNP 4) have their own method of data flow control.

A possibly activated XON/XOFF data flow control between two modems (**AT\G1**) is ignored.

4.10.8 Interface Lines Influenced BY AT Commands

RS232 line	AT command
DCD DTR RTS/CTS DSR	**AT&C** **AT&D** **AT&R, AT&K** **AT&S**

5 AT Command Set

Not all AT commands are available for the different modems (see table "Technical Data" or enclosed short description)

5.1 Overview Basic Commands

Command	Description
AT**	Start the flash loading function
ATA	Answer mode
A/	Repeat last command
AT\A	Select maximum MNP block size
AT%A	Alarm triggering
ATB	CCITT or Bell
AT\B	Send "break" to other modem
AT%C	Enable data compression
AT*C	Remote configuration password
AT&C	DCD (CT109) behavior
ATD	Dialing
AT&D	DTR (CT108/2) behavior
ATE	Command input echo
AT%E	Automatic retrain
AT*E	End the remote configuration
AT&F	Load factory settings
AT\G	Data flow control between modems (XON/XOFF)(not for 56k versions)
ATH	Terminate connection
AT*H	Negotiate speed of set-up protocol (MNP 10)
ATI	Identification
AT&K	Select data flow control between PC and Modem
AT\K	Break control
AT-K	Extended MNP functions (MNP 10)
ATL	Speaker volume
AT%L	Display level of received signal
AT\L	Select block or stream mode for MNP connection (not for 56k versions)
ATM	Speaker control
AT+MS	Select modulation type
AT*M	Select remote terminal
AT\N	Select error correction
ATO	Return to online data mode
AT*P	Password request
ATQ	Quiet control
AT-Q	Fallback to V.22bis and V.22

AT%Q	Display quality of phone connection
AT&R	RTS/CTS behavior
AT*R	Switch remote control on/off
ATS	Write/read S register
AT&S	DSR behavior
ATT	Switch on tone dialing
AT*U	Select protocol of serial interface
ATV	Form of modem messages
AT\V	Form of connect messages
AT&V	Display configuration
AT*V	Define alarm text
AT*V?	Request alarm text
ATW	Messages for error correction
AT&W	Store configuration
ATX	Extended result messages, dial tone detection
AT*X	End remote configuration
ATY	Long break
AT&Y	Select user configuration at hardware reset
ATZ	Software reset / load setting
AT&Z	Store phone numbers

5.2 Description AT Commands

When the modem receives an AT command, it adapts automatically to the baudrate, the number of data bits, and the byte length of the data from the PC.

Every AT command starts with the characters **AT** and ends with a carriage return character (CR). Capitalization is ignored, but the leading characters have to be either **AT** or **at**. The command line is evaluated as soon as the modem has received the carriage return character. A parameter given in parentheses **(n)** means in the description that this is optional. For example **ATL(n)**, where **n** can take on the values 0 to 3, e.g. **ATL2** (medium volume). For commands, which expect a parameter, but are entered without parameter, the modem assumes the value 0 automatically. The command **ATZ** for example causes the same effect like the command **ATZ0**.

5.2.1 Overview About AT Commands

Command	Description
AT**	Starting the flash-loading-function
ATA	Answer mode The modem is set into answer mode (manual answer). In certain countries such as Germany this is only effective, when the parallel connected telephone is picked-up, or a call comes in.
A/	Repeat last command The last command entered is repeated.
AT\A	Select maximum MNP block size Determine the maximum block size for an error corrected MNP transmission. **AT\A0** 64 characters **AT\A1** 128 characters **AT\A2** 192 characters **AT\A3** 256 characters
AT%A	Alarm triggering Triggers an alarm message (SMS dispatch).
ATB	CCITT or Bell **ATB0** Select CCITT modulation **ATB1** Select Bell modulation

Command	Description
AT\B	Send break to the remote modem On a link without error correction (reliable link), the modem sends a break signal to the remote modem. The signal length is: the parameter given times 1/10 seconds. On a link with error correction the modem sends a signal according to the active error correction protocol, without consideration of any parameter given. If no link is operational, or a fax link is active, an error message is given. **AT\B1** 1/10 second break signal, up to **AT\B9** 9/10 second break signal.
AT%C	Enable data compression Enable or disable a certain type of data compression. The modem can only carry out data compression on an error corrected link. **AT%C0** No data compression enabled **AT%C1** Enable MNP5 data compression **AT%C2** Enable V.42bis data compression **AT%C3** Enable MNP5 and V.42bis data compression
AT*C	Remote Control Password With this command you can save a password for remote control into the modem. After the **AT*C** command you are asked for the old password: **OLD PASSWORD** (default is QWERTY or BEISPIEL). An incorrect input leads to **ERROR**. If the input was right, you can enter the new password. It must be between 6 and 12 characters in length. Then the modem asks you to confirm the new password: **CONFIRM**
AT&C	DCD (CT109) options Behavior of RS232 DCD output of the modem **AT&C0** DCD is always on **AT&C1** DCD follows the telephone line carrier signal

Command	Description
ATD	Dial (dialing string) The modem lifts up and dials in accordance with the dialing string given by the **ATD** command. After dialing the modem attempts to establish a connection. If the **ATD** command is sent without a dialing string, then the modem opens the line and attempts to make a connection with the remote modem (without dialing). The behavior of the modem is dependent upon whether or not line current detection is activated (see **ATX** command). Operation of the **ATD** command is also dependant upon when the last dialing attempt was made (see chapter "Dial delay). In FCLASS=0 mode the modem acts as a data modem. It attempts to make contact with another data modem. The attempt is continually repeated until the waiting time limit set in the S7 register has expired. Should this time limit be exceeded then the modem hangs up and displays the error message: **NO CARRIER**. In FCLASS=1 or FCLASS=2 the modem acts as a fax modem. It will attempt to make a connection to another fax modem or fax machine. (The modem adopts HDLC V.21 Channel 2 receive status, acting as though the **AT+FRH** command had been executed). The following characters may be sent as parameters (parentheses, space, and dashes are ignored): **0 to 9** Digits 0 to 9 inclusive ***** *: only with tone dialing # # : only with tone dialing **A - D** Tone dial characters A, B, C, D **P** Specify pulse dialing: tone or pulse dialing may be necessary depending upon location. **T** Specify tone dialing: tone or pulse dialing may be necessary depending upon location. **W** *Await Dial tone*: The modem waits for the dial tone before commencing dialing. If no dial tone is received within the time limit set in the S6 register, the modem hangs up and no error message is displayed. @ *Await silence:* the modem waits for at least 5 seconds silence on the line before executing the next character in the parameter string. If this 5 second silence is not detected and the break-off time specified in the S7 register is not exceeded, the modem ends the call with the message: **NO ANSWER**. If the engaged tone detection is activated the modem ends the call with the message : **BUSY**. If a reply tone is received from the remote modem during the waiting period, a connection is made. **,** Dialing pause: the modem inserts a pause before it executes the next character in a dialing string. The pause length is set in the S8 register. **L** Redial the last number dialed.

	;	Return to input mode after dialing. This is placed at the end of a dialing string, and causes the modem to be returned to input mode when the ; is reached (with response: **OK**). This allows AT commands to be entered, even with the handset off-hook. Any additional AT commands can be included in the same line as the ; character or sent as additional input lines. The connection can be broken with the **ATH** command and the *handset* can be replaced.
	S=n	Dial the nth number from the number memory that was entered with the **AT&Z** command.
	!	Flash. If the flash character is in a dialing string the modem hangs up after the time specified in the S29 register, and then goes off hook again.
	>	If the > character is in a dialing string, the modem acts as though the earth key was pressed, thereby putting one of the two phone lines to *earth*. Some telephone systems require this to access an exchange line.
	Ù	Suppresses the transmission of a calling tone. Default is: Call tone sent on fax operation, no call tone for data operation.
	( )	Ignored, these are only used to assist clarity
	-	Ignored, these are only used to assist clarity
	' '	Spaces are ignored, they are only used to assist clarity.
	Examples:	
	ATD12345	Dial the telephone number 12345
	ATDP12345	Dial with pulse dialing the number 12345
	ATDT12345	Dial with tone dialing the number 12345
	ATD12345;	With the semicolon, the modem gets back to the command mode after dialing
	ATX3D0W12345;	
	-	for private branch exchanges, which get the local loop with a 0 or a 9: First blind dialing must be activated with "**X3**" (look also „**ATX3** command"), to dial the leading 0, without hearing a dial tone. After the dialing of the 0 with "**D0**", the dial tone detection can be reactivated with the parameter "**W**". Though the modem waits for the dial tone AND finalizes the dialing (with "12345") only, if the dial tone was heard. The waiting for the dial tone can be dropped with the command **ATX3D012345**.
	-	For private branch exchanges, which get the local loop by earth function: First blind dialing must be activated with "**X3**" (look also „**ATX3** command"), to obey the earth function without hearing the dial tone. After the activity of the earth by >, the dial tone detection can be reactivated with the parameter "**W**". Though the modem waits for the dial tone AND finalizes the dialing (with "12345") only, if the dial tone was heard. The waiting for the dial tone can be dropped with the command **ATX3D12345**.

Command	Description
AT&D	DTR (CT108/2) operation DTR (CT108/2) operation - monitoring of On/Off state changes of RS232 connections on the PC. **AT&D0** DTR is ignored, permits operation with PC's that do not support DTR. **AT&D1** A DTR On/Off change causes the modem to act as though it had received a **+++** break sequence. The modem goes into input mode without hanging up. **AT&D2** A DTR On/Off change causes the modem to hang up. Automatic pick-up is not possible. **AT&D3** A DTR On/Off change causes the modem to execute a reset, as if an **AT&Y** command had been given. A preceding **AT&Y** command decides whether one of the two configurations, 1 or 2, should be loaded.
ATE	Echo command input This command switches on or off the repeat display of commands that the modem carries out in response to commands generated by the PC. **ATE0** Echo off **ATE1** Echo on
AT%E	The modem executes the retrain process when a transmission problem occurs. After three unsuccessful retrain attempts, the modem hangs up. **AT%E0** Retrain disabled **AT%E1** Retrain enabled **AT%E2** Fall-back, fall-forward enabled **AT%E3** Fast fall-back, fall-forward. Not supported by all modem models.
AT*E	End remote control The command **AT*E** command finishes the remote control

Command	Description
AT*Fn	Select the transmission speed at the serial interface. The speed can be preselected with this command. But this does not switch off the automatic detection. As soon as an **AT** is detected, the serial interface changes to the detected speed and protocol. If no **AT** is sent, the selected speed is kept until a hardware reset. If the selected speed is to be kept beyond this, it has to be stored with **AT&W**. Attention: The register S23 is not changed with this command! It only changes with automatic speed detection. **AT*F0** keep current speed. **AT*F1** 300 bps **AT*F2** 600 bps **AT*F3** 1.200 bps **AT*F4** 2.400 bps **AT*F5** 4.800 bps **AT*F6** 9.600 bps **AT*F7** 19.200 bps **AT*F8** 38.400 bps **AT*F9** 57.600 bps **AT*F10** 115.200 bps
AT&F	Load factory configuration. The modem loads the factory configuration from the internal non-volatile memory. This allows the modem to be put into defined basic state. A portion of the S register can also be stored using the **AT&F** command. (Our model range is fitted with two different factory configurations, **AT&F0** and **AT&F1**).
AT\G	Data flow control between modems (XON/XOFF) Disables or enables flow control on non-error-corrected links (reliable links). Flow control is selected by the ASCII characters XON and XOFF. The modem interrupts the data transmission upon receipt of an XOFF character, and re-starts the transmission on receipt of an XON character. Error corrected transmissions employ their own form of flow control. On error corrected links, therefore, any previously entered flow controls are ignored. The XON/XOFF flow control should be disabled for BTX operations mode. **AT\G0** Modem/modem flow control disabled **AT\G1** Modem/modem flow control enabled via XON/XOFF
ATH	Disconnect The modem hangs up.

Command	Description
AT*H	Synchronize speed of connection set-up protocol **AT*H** specifies the speed at which synchronization is handled when setting up an MNP10 link, before the modem goes into MNP10 mode. **AT*H0** Set-up takes place at highest possible speed **AT*H1** Set-up at 1.200 bps **AT*H2** Set-up at 4.800 bps
ATI	Identification The modem sends an identifier to the PC in accordance with the parameter. **ATI0** Product code **ATI1** Previously calculated checksum of the EPROM **ATI2** Calculation of EPROM's checksum and comparison with the previously calculated checksum stored in the EPROM. Output of **OK** if comparison correct. **ATI3** EPROM firmware version number **ATI4** Modem version number **ATI5** Country code parameter (Germany = 006 / Europe = 253) **ATI6** Data pump version number and revision.
AT&K	Select flow control between modem and PC Default for fax operation is RTS/CTS. T-Online requires **AT&K0**. **AT&K0** No flow control **AT&K3** Select flow control RTS/CTS **AT&K4** Select flow control XON/XOFF **AT&K5** Select transparent flow control XON/XOFF **AT&K6** Select RTS/CTS and XON/XOFF flow control

Command	Description
AT\K	Break control The modem reacts to a break command from a remote modem or from the PC, or to an **AT\B** command in accordance with the parameter n. **1st Situation:** In the case of a break originating from the PC during a data connection to a remote modem: **AT\K0** Modem goes into command mode, does not send a break signal to the remote modem. **AT\K1** Modem clears the data buffer, sends break signal to the other modem. **AT\K2** As **AT\K1** **AT\K3** Send back to remote modem immediately **AT\K4** As **AT\K0** **AT\K5** The modem places a break signal in the data transmitted to the remote modem. **2nd Situation:** The modem is put into command mode during a data connection with the escape sequence **+++**. In this condition an **AT\B** command leads to the transmission of a break signal to the remote modem. The parameter n has the following effect in this situation: **AT\K0** Modem clears the data buffer, sends break signal to the other modem. **AT\K1** As **AT\K0** **AT\K2** Modem sends break signal immediately to the remote modem. **AT\K3** As **AT\K2** **AT\K4** The modem places a break signal in the data transmitted to the remote modem. **AT\K5** As **AT\K4**. Return from Online command mode is achieved with an **ATO** command. **3rd Situation:** In the case of the reception of a break signal from the remote modem during a non-error-corrected link, the parameter has the following effect: **AT\K0** The modem clears the buffer, send a break to the PC. **AT\K1** As **AT\K0** **AT\K2** The modem sends a break to the PC immediately. **AT\K3** As **AT\K2** **AT\K4** Sends a break to the PC embedded in the data received from the remote modem. **AT\K5** As **AT\K4** (default).

Command	Description
AT-K	Extended MNP functions (MNP10) This command determines whether a V.42 LAP-M link can be changed to an MNP10 link. **AT-K0** Prevents V.42 LAP-M to MNP10 change. **AT-K1** Allows V.42 LAP-M to MNP10 change.
ATL	Speaker volume This command controls the speaker volume (see **ATM**). **ATL1** speaker low volume **ATL2** speaker medium volume **ATL3** speaker high volume **Note:** The speaker output is optional and not supported in the standard version.
AT%L	Display level of received signal The value indicated by the modem is the amplified signal in the modem, not the level on the phone line. Large **AT%L** values indicate a low signal level; small values a large signal level. (009 = -9dB, 043 = -43 dB.)
ATM	Speaker control This command controls the activity of the speaker (see command **ATL**). **ATM0** speaker always OFF **ATM1** speaker ON when dialing and connection set-up **ATM2** speaker always ON **ATM3** speaker ON at connection set-up **Note:** The speaker output is optional and not supported in the standard version.

Command	Description
AT+MS	Select modulation type The modulation type is set with the **AT+MS** command. The command enables or disables automatic modulation detection and sets the highest and lowest possible connection speed. The command is in the form **AT+MS=MODULATION, [Automode], [Receive: Minbaud, Maxbaud]; [µ-Law, A-Law], [reserved], [Send Speed: Maxbaud]** **AT+MS?** displays the current setting. **AT+MS=?** displays a list of possible parameters. **Modulation parameter:** The modulation parameter sets the preferred (automode = 1) or the specified (Automode = 0) modulation type. **The following values are available:** 0 V.21 300 1 V.22 1.200

	2 V.22bis 2.400 or 1.200 3 V.23 1.200 9 V.32 9.600 or 4.800 10 V.32bis 14.400, 12.000, 9.600, 7.200 or 4.800 11 V.34 33.600, 31.200, 28.800, 26.400, 24.000, 21.600, 19.200, 16.800, 14.400, 12.000, 9.600, 7.200, 4.800 or 2.400 12 V.90 56000, 54667 ,53333 ,52000, 50667, 49333, 48000, 46667, 48000, 46667, 45333, 42667, 41333, 40000, 38667, 37333, 36000, 34667, 33333, 32000, 30667, 29333, 28000 56 K56flex 56000, 54667 ,53333 ,52000, 50667, 49333, 48000, 46667, 48000, 46667, 45333, 42667, 41333, 40000, 38667, 37333, 36000, 34667, 33333, 32000 64 Bell 103 300 69 Bell 212 1.200 **Automode parameter:** With the optional automode parameter it is possible to determine if the modem can automatically adapt to the required modulation type. The following values are accepted: 0 Automatic adaptation to modulation disabled. 1 Automatic adaptation to modulation enabled. **Receive Minbaud parameter:** The optional minbaud parameter sets the lowest possible baud rate at which the modem receives. **Receive Maxbaud parameter:** The optional maxbaud parameter sets the highest possible baud rate at which the modem receives. **Parameter m-Law, A-Law** Selection of the ISDN-coding **Reserved parameter** = always 0 **Send Speed Maxbaud parameter** The optional maxbaud parameter sets the highest possible baud rate at which the modem sends data. **Example:** **AT+MS=12,1,300,56000,0,0,33600** (automatic adaptation to remote terminal, minimum speed of 300 bps. The maximum receive speed is 56.000bps and the maximum send speed is 33.600bps).
AT*M	Selection of the remote terminal Determines the protocol with which the alarm string is to be sent to the network provider. **AT*M0** remote terminal normal line-modem **AT*M1** remote terminal D1 Net or E-Net **AT*M4** remote terminal D2 Net
AT\N	Select error correction

	This command determines which type of error correction is the preferred choice to be employed for future connections. **AT\N0** Disable error correction. **AT\N1** direct mode (only for special data formats) **AT\N2** Selects V.42 LAPM or MNP4 error correction. If an error corrected link can not be made, it causes a hang-up. **AT\N3** Selects V.42 LAPM or MNP4 error correction. If such a link is not possible, a reliable link is attempted . **AT\N4** Exclusively selects V.42 LAPM link. **AT\N5** Exclusively selects MNP4 link.
ATO	Return to on-line data mode. **ATO0** If the modem is in online command mode it returns to online data mode. If the modem is in online data mode it sends an **ERROR** message. **ATO1** Causes retrain process, before the modem goes into online data mode.

Command	Description
AT*P	Password request **AT*P0** turns off the password request after the dial-up **AT*P1** turns on the password request after the dial-up If the password request is turned on, the modem asks for it after the **CONNECT**. After the right input of the password, the intrinsic connection is established and data can be transmitted. If the password was wrong, the modem hangs up. It's the same password as the one of the remote control and can be set with **AT*C**. (S register 14, Bit 6)
ATQ	Quiet control This command switches on or off the sending of messages from the modem to the PC. **ATQ0** Send messages to the PC **ATQ1** Send no messages to the PC.
AT-Q	Fall-back to V.22bis and V.22 **AT-Q0** prevents fall-back to V.22bis and V.22 **AT-Q1** enables fall-back to V.22bis or V.22 respectively.
AT%Q	Display phone connection quality A modem message with a value between 000 and 007 denotes a good quality telephone connection. The lower the value, the better the quality. High values indicate poor quality. These values are constantly updated during a call. If the value increases much during a call i.e. the quality has deteriorated, an ***Autoretrain*** is executed, providing a preceding **AT%E** command has enabled this facility.
AT&R	RTS/CTS options This command determines how the modem responds to RTS/CTS (CT105/CT106) flow control connections. (see also the **AT&K** command). **AT&R0** CTS reaction as V.25bis **AT&R1** RTS signals are ignored. CTS only goes to *off* if required by flow control.
AT*R	Turn on/off remote control **AT*R0** Turns off remote control **AT*R1** Turns on remote control

Command	Description
ATS	Write to/read from S register Some S registers can only be changed within certain limits. The modem still gives an **OK**, even if the value has not been altered as shown. Some registers can only be read. It is, therefore, recommended to check the results of a write to the register with the **ATSn?** command. **ATSn=x** Sets the S register n to the value x. **ATSn?** Shows the value of the S register n.
AT&S	DSR options This command determines how the modem responds to its DSR (CT107) output. **&S0** DSR always on **&S1** DSR ***on***, once a reply tone is detected, DSR ***off*** once carrier is no longer detected.
ATT	Enable tone dialing Once this command has been executed, all subsequent calls will be dialed using tone dialing, until either an **ATP** or **ATDP** command is executed to revert to pulse dialing.

Command	Description
AT*Un	Select the protocol at the serial interface You can pre select the protocol with this command. But the auto detection will not be turned off. If an AT command is detected, the serial interface triggers automatically the detected speed and detected protocol. If no AT command is sent, the selected protocol rests until a hardware reset. If you wanted to store the used protocol, you have to save it with **AT&W**. **Important:** The S-register S23 will not be changed with this command. This will only be changed with the auto speed- and protocol-detection. **AT*U0** 8 data bits, no parity, 1 stop bit **AT*U1** 7 data bits, parity ODD, 1 stop bit **AT*U2** 7 data bits, parity EVEN, 1 stop bit **AT*U3** 7 data bits, no parity, 1 stop bit **AT*U4** 7 data bits, parity ODD, 2 stop bits **AT*U5** 7 data bits, parity EVEN, 2 stop bits **AT*U6** 7 data bits, no parity, 2 stop bits **AT*U7** 8 data bits, parity ODD, 1 stop bit **AT*U8** 8 data bits, parity EVEN, 1 stop bit **AT*U9** 8 data bits, no parity, 2 stop bit
ATV	Style of modem message This command determines whether the modem sends messages to the PC in long form or short form. **ATV0** Messages to the PC in short form, i.e. only the error number. **ATV1** Messages to the PC in long form, i.e. the error text.
AT\V	Form of the connect messages This command enables the display of the connect message in one (**\V1**) or in three (**\V0**) lines.
AT&V	Display configurations This command activates the display of current active configuration of the modem, the stored user configurations, and stored telephone numbers 0 to 3.
AT*V	Defines the alarm text After you call this command, the modem asks for the alarm text. In the remote mode you can not use this command.
AT*V?	Requests the alarm text With this command you can check the alarm text

Command	Description
ATW	Error correction messages This command defines which specification of data transmission rates are made for a **CONNECT** message **ATW0** The modem sends the baudrate between the modem and the PC **ATW1** The modem sends the speed of the telephone cable, the mistake protection protocol and the PC-baudrate. **ATW2** The modem sends the speed of the telephone cable.
AT&W	Store configurations This command saves the actual configuration of the modem including the s-registers in one of the both user-defined defaults. **AT&W0** Saving in user default 0 **AT&W1** Saving in user default 1
ATX	Extended result reporting, dial tone detection. This command determines which group of messages are sent to the PC by the modem. This is important on PBX's, as a leading 0 or 9 must be dialed before a dial tone is heard on the line. *Blind dialing* (dialing without having a dial tone) is activated or deactivated depending on parameter. Dial tone detection, however, can always be forced with the W parameter in an **ATD** dial string (see **ATD** command). In **AT+FCLASS=1,2** mode, the modem always sends the **CONNECT** message to the PC on call set-up without giving the transmission speed. The table in chapter eleven shows the messages with reference to the **ATX** parameter. **ATX0** No dial tone detection, this means that an unsuccessful dial attempt leads to the message **NO CARRIER**. No engaged tone detection, this means that on a busy line the message shown is **NO CARRIER**. **ATX1** As **ATX0** **ATX2** Dial tone detection active, this means that a dial attempt without the presence of a dial tone being detected leads to the message **NO DIAL TONE**. No engaged tone detection, this means that on a busy line the message shown is **NO CARRIER**. **ATX3** No dial tone detection, this means that an unsuccessful dial attempt leads to the message **NO CARRIER**. Engaged tone detection active, this means that when calling a busy line the message **BUSY** is given. **ATX4** Dial tone detection active, this means that a dial attempt without the presence of a dial tone being detected leads to the message **NO DIAL TONE**. Engaged tone detection active, this means that when calling a busy line the message **BUSY** is given.

Command	Description
AT*X	Ending the remote configuration The **AT*X** command ends a remote configuration.
ATY	Long space (Break) This command determines the action of the modem on receipt of a long space (**BREAK**), or in what form the modem produces a long space. **ATY0** No break processing **ATY1** Break processing active. On reliable links the modem sends a break of 4 seconds before *hanging up*. The modem responds to the receipt of a break (longer than 1.6 seconds) by *hanging up*.
AT&Y	Select user configuration for hardware reset **AT&Y0** On a hardware reset following the command **AT&Y0**, user configuration 0 (produced with the **AT&W0** command) is loaded as the current modem configuration. **AT&Y1** On a hardware reset following the command **AT&Y1**, user configuration 1 (produced with the **AT&W1** command) is loaded as the current modem configuration.
ATZ	Software reset / load configuration This command causes the modem to execute a software reset. The modem loads the configuration saved by the user. If no parameter is given, then user configuration 0 is loaded. **ATZ0** Software reset followed by loading user configuration 0. **ATZ1** Software reset followed by loading user configuration 1.
AT&Z	Store phone numbers This command saves four entries (0 to 3) permanently in the EPROM. Each entry may be up to 35 characters in length. The entries can be overwritten and must correspond to the dial string as specified in the **ATD** command. **AT&Zn=x** **n** is the number of the entry in the list (from 0 to 3) **x** is the dial string with the phone number **AT&Z0=xxx** sets the service number of the mobile provider (xxx stands for number) **AT&Z1=xxx** entry of the reply phone number into the modem calling back (xxx stands for the phone number) **AT&Z2=xxx** phone number of the mobile phone (xxx stands for number) for SMS alarm
<Pause> **** <Pause>	starts the remote configuration of the local modem

5.3 Overview Fax- And Voice Commands

Please refer to your supplier for more detailed documents about the commands of Fax Class 2 as well as a documentation of the voice commands.

5.4 AT Messages

List of the message numbers and texts depending on the **ATX** command.

Message number short form	Message text in long form	ATXn n=0	n=1	n=2	n=3	n=4
+F4	+FCERROR	X	X	X	X	X
0	OK	X	X	X	X	X
1	CONNECT	X	X	X	X	X
2	RING	X	X	X	X	X
3	NO CARRIER	X	X	X	X	X
4	ERROR	X	X	X	X	X
5	CONNECT 1200	1	X	X	X	X
6	NO DIAL TONE	3	3	X	3	X
7	BUSY	3	3	3	X	X
8	NO ANSWER	1	X	X	X	X
9	CONNECT 600	1	X	X	X	X
10	CONNECT 2400	1	X	X	X	X
11	CONNECT 4800	1	X	X	X	X
12	CONNECT 9600	1	X	X	X	X
13	CONNECT 7200	1	X	X	X	X
14	CONNECT 12000	1	X	X	X	X
15	CONNECT 14400	1	X	X	X	X
16	CONNECT 19200	1	X	X	X	X
17	CONNECT 38400	1	X	X	X	X
18	CONNECT 57600	1	X	X	X	X
19	CONNECT 115200	1	X	X	X	X
20	CONNECT 230400	X	X	X	X	X
22	CONNECT 75TX/1200RX	1	X	X	X	X
23	CONNECT 1200TX/75RX	1	X	X	X	X
24	DELAYED	4	4	4	4	X
32	BLACKLISTED	4	4	4	4	X
33	FAX	X	X	X	X	X
35	DATA	X	X	X	X	X
40	CARRIER 300	X	X	X	X	X
44	CARRIER 1200/75	X	X	X	X	X
45	CARRIER 75/1200	X	X	X	X	X
46	CARRIER 1200	X	X	X	X	X

Message number short form	Message text in long form	ATXn n=0	n=1	n=2	n=3	n=4
47	CARRIER 2400	X	X	X	X	X
48	CARRIER 4800	X	X	X	X	X
49	CARRIER 7200	X	X	X	X	X
50	CARRIER 9600	X	X	X	X	X
51	CARRIER 12000	X	X	X	X	X
52	CARRIER 14400	X	X	X	X	X
53	CARRIER 16800	X	X	X	X	X
54	CARRIER 19200	X	X	X	X	X
55	CARRIER 21600	X	X	X	X	X
56	CARRIER 24000	X	X	X	X	X
57	CARRIER 26400	X	X	X	X	X
58	CARRIER 28800	X	X	X	X	X
59	CONNECT 16800	1	X	X	X	X
61	CONNECT 21600	1	X	X	X	X
62	CONNECT 24000	1	X	X	X	X
63	CONNECT 26400	1	X	X	X	X
64	CONNECT 28800	1	X	X	X	X
66	COMPRESSION: CLASS 5	X	X	X	X	X
67	COMPRESSION: V.42 bis	X	X	X	X	X
69	COMPRESSION: NONE	X	X	X	X	X
70	PROTOCOL: NONE	X	X	X	X	X
77	PROTOCOL: LAP-M	X	X	X	X	X
78	CARRIER 31200	X	X	X	X	X
79	CARRIER 33600	X	X	X	X	X
80	PROTOCOL: ALT	X	X	X	X	X
81	PROTOCOL: ALT-CELLULAR	X	X	X	X	X
84	CONNECT 33600	X	X	X	X	X
91	CONNECT 31200	X	X	X	X	X
150	CARRIER 32000	X	X	X	X	X
151	CARRIER 34000	X	X	X	X	X
152	CARRIER 36000	X	X	X	X	X
153	CARRIER 38000	X	X	X	X	X
154	CARRIER 40000	X	X	X	X	X
155	CARRIER 42000	X	X	X	X	X
156	CARRIER 44000	X	X	X	X	X
157	CARRIER 46000	X	X	X	X	X
158	CARRIER 48000	X	X	X	X	X
159	CARRIER 50000	X	X	X	X	X
160	CARRIER 52000	X	X	X	X	X
161	CARRIER 54000	X	X	X	X	X
162	CARRIER 56000	X	X	X	X	X
165	CONNECT 32000	X	X	X	X	X

Message number short form	Message text in long form	ATXn n=0	n=1	n=2	n=3	n=4
166	CONNECT 34000	X	X	X	X	X
167	CONNECT 36000	X	X	X	X	X
168	CONNECT 38000	X	X	X	X	X
169	CONNECT 40000	X	X	X	X	X
170	CONNECT 42000	X	X	X	X	X
171	CONNECT 44000	X	X	X	X	X
172	CONNECT 46000	X	X	X	X	X
173	CONNECT 48000	X	X	X	X	X
174	CONNECT 50000	X	X	X	X	X
175	CONNECT 52000	X	X	X	X	X
176	CONNECT 54000	X	X	X	X	X
177	CONNECT 56000	X	X	X	X	X
178	CONNECT 230400	X	X	X	X	X
180	CARRIER 28000	X	X	X	X	X
181	CARRIER 29333	X	X	X	X	X
182	CARRIER 30667	X	X	X	X	X
183	CARRIER 33333	X	X	X	X	X
184	CARRIER 34667	X	X	X	X	X
185	CARRIER 37333	X	X	X	X	X
186	CARRIER 38667	X	X	X	X	X
187	CARRIER 41333	X	X	X	X	X
188	CARRIER 42667	X	X	X	X	X
189	CARRIER 45333	X	X	X	X	X
190	CARRIER 46667	X	X	X	X	X
191	CARRIER 49333	X	X	X	X	X
192	CARRIER 50667	X	X	X	X	X
193	CARRIER 53333	X	X	X	X	X
194	CARRIER 54667	X	X	X	X	X

Notes to the table

An ***X*** in the column means that a message is sent either in long form or in short form (according to **ATV** command). The numbers 0 to 4 in the heading mean the parameters for the commands **ATX0** to **ATX4**.

If a number is in a column, this means that an error message according to this error number is put out.

6 S Register

S-registers can be read and written with the **ATS** command (See chapter 8 "AT command set", command **ATS**). Certain S-registers can only be read, while others can only be set within a limited range of values.

If a value limit is exceeded, the modem will respond **OK**, even though the value is not accepted. Therefore, it is recommended to check the contents of a register, after changes have been made by use of the **ATSn?** command.

6.1 Overview S Register

Register	Function	Units	stored in EEPROM with AT&W
S0	Rings to Auto-Answer	Rings	*
S1	Ring Counter	Rings	
S2	Escape Character	ASCII	*
S3	Carriage Return Character	ASCII	
S4	Line Feed Character	ASCII	
S5	Backspace Character	ASCII	
S6	Wait Time for Dial Tone	s	*
S7	Wait Time for Carrier	s	*
S8	Pause Time for Dial Delay Modifier	s	*
S9	Carrier Detect Response Time	0.1 s	*
S10	Carrier Loss Disconnect Time	0.1 s	*
S11	Data Transmit Control	1s	*
S12	Escape Prompt Delay	0.02 s	*
S13	Number of dial attempts for alarm		*
S14	General Bit Mapped Options Status	-	*
S17	Remote-initial character	ASCII	
S21	V.24/General Bit Mapped Options Status	-	*
S22	Speaker/Results Bit Mapped Options Status	-	*
S25	Delay to DTR Off	0.01 s	
S26	RTS-to-CTS Delay	0.01 s	
S29	Flash Dial Modifier Time	10 ms	
S30	Disconnect Inactivity Timer	10 s	
S31	General Bit-Mapped Options Status	-	*

Register	Function	Units	stored in EEPROM with AT&W
S32	XON Character	ASCII	
S33	XOFF Character	ASCII	
S36	LAPM Failure -control	-	*
S38	Delay Before Forced Hang-up	S	
S39	Flow Control Bit Mapped Options Status	-	*
S40	General Bit-Mapped Options Status	-	*
S41	General Bit-Mapped Options Status	-	*
S46	Data Compression Control	-	*
S48	V.42 Negotiation Control	-	*
S86	Call Failure Reason Code	-	
S91	Send level	-	*
S95	Result Code Messages Control	-	*

These registers are stored to the EEPROM with the command **AT&W**.

6.2 Description S Register

Note: Registers marked with *) are stored to the user settings with **AT&W**.

S0* Rings to Auto-Answer

The number of call ring signals before the modem answers. A value of S0=0 means that the modem will not answer. S0 can accept a value between 0 and 5.

S1 Ring Counter

Counter for call rings.

S1 can only be read. S1 resets to zero when the modem is waiting for a call.

S2* Escape Character

Escape character, which effects a switch from data mode to online command input mode. Values greater than 127 have the effect that an escape character is not recognized.

S3 Carriage Return Character

S4 Linefeed Character

S5 Backspace Character

S6* Wait Time for Dial Tone (Before Blind Dialing)

Maximum time to wait for a dial tone.
After the modem has picked up, it waits for a dial tone for the set time. If a dial tone is detected during the wait period, dialing begins.
If no dial tone is detected, the modem checks whether dial tone detection is activated, or whether the parameter W (chapter 8 "AT command set", **ATD** command) is present in the dial string. If the dial tone detection is inactive, the modem waits for the time given in S6 (in seconds) for the dial tone. S6 can have a value between 4 and 7.

S7* Wait for Carrier

Waiting for a carrier frequency from the remote modem. S7 determines the maximum time, that the modem waits for a reply from the remote modem. The time begins to run when the modem has finished dialing. S7 can have a value between 0 and 100 seconds.

S8* Pause Time for Dial Delay Modifier

Dial pause time if a comma is in the dial string.
The modem waits during dialing for the time specified in S8 (in seconds) if a comma is present in the dial string. S8 can have a value between 1 and 7 seconds.

S9* Carrier Detect Response Time

DCD reaction time for a carrier frequency received from the remote modem.
The DCD output of the modem's RS232 interface (CT109) goes to ***on*** if a carrier frequency is detected from the remote modem within the time defined in S9 (in tenths of a second). S9 must be less than S10.

S10* Carrier Loss Disconnect Time

The time of a carrier loss required for the modem to terminate the connection.
S10 gives the time, in tenths of a second, which the modem waits when the carrier from the remote modem is no longer detected before disconnecting the connection.

S12* Escape Prompt Delay

Minimum time period, in tenths of a second, that must be maintained before, between, and after two characters so that the modem correctly detects an escape sequence (normally **+++**).

S13* Number of dial attempts for alarm

Bit	Signification	
Bit 0 – 3	Number of dialing attempts	Value range: 1...12 Default value: 3 S13 determines the dial attempts for an alarm message. **Note:** The limit to a maximum of 12 attempts is required for reasons of certification (blacklisting).
Bit 4 – 7	Reserved	

S14* General Bitmapped Options Status

Bit	Signification	
Bit 0	Reserved	
Bit 1	Echo input	Command echo 0: Echo off 1: Echo on
Bit 2	Reserved	
Bit 3	Results format	Result codes: 0: Message numbers (**ATV0**) 1: Message texts (**ATV1**)
Bit 4	Reserved	
Bit 5	Tone / pulse dialing	Tone / pulse 0: Tone dialing (**ATT**) 1: Pulse dialing (**ATP**)
Bit 6	Reserved	
Bit 7	Call / answer	Originate / answer 0: Answer mode 1: Call mode (originate)

S17* Remote initial character

In S17, the ASCII code of the character, used to start the remote configuration, is defined. Values >127 switch off remote configuration completely. Default setting of S17 is "42", which is ASCII character "*****", i.e. the remote configuration is started with the escape sequence **<Pause> "****" <Pause>**.
(Note: The number of characters in the escape sequence is fix set to "4")

S21* General Bitmapped Options Status – settings for V24

Bit	Signification	
Bit 0, 1	Reserved	
Bit 2	CTS behavior	CT106 (CTS) behavior: 0: as for **AT&R0** 1: as for **AT&R1**
Bit 3 - 4	DTR behavior	CT108 (DTR) behavior: 0: as for **AT&D0** 1: as for **AT&D1** 2: as for **AT&D2** 3: as for **AT&D3**
Bit 5	DCD behavior	CT109 (DCD) behavior: 0: as for **AT&C0** 1: as for **AT&C1**
Bit 6	DSR behavior	CT107 (DSR) behavior: 0: as for **AT&S0** 1: as for **AT&S1**
Bit 7	Long space disconnect	Long space disconnect: 0: as for **ATY0** 1: as for **ATY1**

S22* Speaker/Results Bitmapped Options Status

Bit	Signification	
Bit 0, 1	Speaker volume	Speaker volume: 0: Off (**ATL0**) 1: Quiet (**ATL1**) 2: Medium (**ATL2**) 3: Loud (**ATL3**)
Bit 2 – 3	Speaker function	Speaker control: 0: Off (**ATM0**) 1: Off till carrier (**ATM1**) 2: Always on (**ATM2**) 3: On during set-up (**ATM3**)
Bit 4 – 6	Error message group	Limit results codes: 0: Like **ATX0** 4: Like **ATX1** 5: Like **ATX2** 6: Like **ATX3** 7: Like **ATX4**
Bit 7	Reserved	

S25 Delay to DTR Off

The time that the modem permits the DTR signal to remain off before hanging up (in hundredths of a second).

S26 RTS-to-CTS Delay

Time between the activity of RTS and CTS in 1/100 second.

S29 Flash Dial Modifier Time

Sets the time, in tenths of a second, that the modem takes to hang up if a flash is included in the dial string.

S30 Disconnect Inactivity Timer

The time that the modem waits without activity before it hangs up. The unit is seconds (fax class 1 only).

S31* General Bitmapped Options Status

Bit	Signification	
Bit 0		
Bit 1	Representation Connect message	0: 3-line message (**\V0**) 1: extended 1-line message (**\V1**)
Bit 2 - 3	Error correction messages	Error correction messages: 0: PC baud rate only (**ATW0**) 1: PC and phone baud rate (**ATW1**) 2: Phone baud rate only (**ATW2**)
Bit 4 - 7	Reserved	

S32 XON Character

ASCII code of the character that is recognized by the modem as XON.

S33 XOFF Character

ASCII code of the character that is recognized by the modem as XOFF.

S36* LAPM Failure Control

This register determines what happens when an attempt to set-up a V.42 LAPM connection fails. It is connected with register S48.

Bit	Signification	
Bit 0..2	This register determines what happens if an attempt to set up a V.42 LAP-M connection fails. It is used in conjunction with the S48 register.	0 The modem hangs up. 1 The modem stays online and sets up a direct mode connection. 2 Reserved 3 The modem stays online and sets up a normal mode connection. 4 The modem tries to set up an MNP connection. It hangs up if this fails. 5 The modem tries to set up an MNP connection. A direct mode connection is made if this fails. 6 Reserved 7 The modem tries to set up an MNP connection. A normal mode connection is made if this fails.
Bit 3..5	Reserved	
Bit 7		1: call answer unlocked (**AT*A1**) 0: call answer locked (**AT*A0**)

S38 Delay Before Forced Hang-up

Maximum time in seconds that remains for the buffers to erase their data after the command to hang up has been received. Only valid for error corrected links.

S39* PC / Flow Control Modem

Selection of the data flow control between PC and modem.
S39=0 No flow control (**AT&K0**)
S39=3 RTS/CTS flow control (**AT&K3**)
S39=4 XON/XOFF flow control (**AT&K4**)
S39=5 Transparent XON flow control (**AT&K5**)
S39=6 RTS/CTS and XON/XOFF flow control

S40* General Bitmapped Options Status

Bit	Signification	
Bit 0	V.42 to MNP 10 conversion	MNP 10 Extended Service 0: No V.42/MNP 10 (**AT-K0**) 1: V42 to MNP10 conv. (**AT-K1**)
Bit 1	Power level Adjustment MNP10 for 56k version reserved	Power Level Adjustment for Cellular MNP 10 0: No powerl. adj. (**AT)M0**) 1: Powerl. adjustm. (**AT)M1**)
Bit 2	MNP speed for 56k version reserved	MNP link negotiation speed 0: highest speed (**AT*H0**) 1: 1.200 bps (**AT*H1**)
Bit 3-5	Break behavior	Break Handling 0: like **AT\K0** 1: like **AT\K1** 2: like **AT\K2** 3: like **AT\K3** 4: like **AT\K4** 5: like **AT\K5**
Bit 6-7	MNP block size	MNP Block Size 0: 64 characters (**AT\A0**) 1: 128 characters (**AT\A1**) 2: 192 characters (**AT\A2**) 3: 256 characters (**AT\A3**)

S41* General Bitmapped Options Status

Bit	Signification	
Bit 0, 1	Select compression type	Compression selection 0: No compression (**AT%C0**) 1: MNP5 (**AT%C1**) 2: V.42bis (**AT%C2**) 3: MNP5 or V.42bis (**AT%C3**)
Bit 2	Auto retrain	Auto retrain control 0: No auto retrain (**AT%E0**) 1: Auto retrain (**AT%E1**)
Bit 3	Flow control modem / modem for 56k version reserved	Modem to modem flow control 0: Off (**AT\G0**) 1: On (**AT\G1**)
Bit 4	MNP block mode for 56k version reserved	Block mode control MNP 0: Stream mode (**AT\L0**) 1: Block mode (**AT\L1**)
Bit 5	Reserved	
Bit 6	Fallback / fall forward	Fallback/fall forward control 0: No fallback/fall forward 1: FB/FF (**AT%E2**)
Bit 7	Reserved	

S46* V.42bis Data Compression

S46=136 No data compression.
S46=138 V.42bis data compression on.

S48* V.42 Negotiation Control

S48=0 Only LAP-M connection possible
S48=7 LAP-M or MNP 4 connection
S48=128 Connection protocol as specified in S36

S86 *Call Failure reason Code*

On a connection break (**NO CARRIER**) an occurrence (**ERROR**) code is written to this register.

S86=0 normal connection set-up, no error
S86=4 carrier lost
S86=5 an error corrected (V.42) connection could not be established
S86=6 extensions could not be negotiated
S86=7 remote site only supports synchronous mode
S86=8 no mutual framing found
S86=9 no protocol at all could be established
S86=10 invalid response when negotiating extensions
S86=11 no synchronous marks received from remote site
S86=12 normal connection termination by remote site
S86=13 remote site does not react any longer (ten attempts)
S86=14 protocol error
S86=15 DTR drop
S86=16 remote site required termination (GSTN cleardown)
S86=17 inactivity timer timed out
S86=18 required speed not supported
S86=19 long space disconnect
S86=20 key abort (characters have been sent during connection set-up)
S86=22 no connection set-up possible
S86=23 termination after 3 retrains
S86=26 remote site hung up

S91* Send level

In register S91, the value for the send level of the modem is stored. The value can be set between 0 and 15. The connection can be improved by decreasing the send level in some cases.

S91=0 Send level –1 dBm

S91=5 Default setting for DC 56K

S91=15 Send level –26 dBm

S95* Result Code Control

Bit	Signification
Bit 0	CONNECT message with line speed
Bit 1	CONNECT / ARQ message on error corrected connection
Bit 2	CARRIER message enabled (messages 40 - 47)
Bit 3	PROTOCOL message enabled (messages 70 - 80)
Bit 4	Reserved
Bit 5	COMPRESSION message enabled (messages 66 - 69)
Bit 6	Reserved
Bit 7	Reserved

Glossary

Analogue Opposite of Digital. Analogue variables can represent any value.

Answer In a modem communication always one modem is receiver (Answer-Mode) and one is sender (Originate-Mode).

ARQ Automatic Retransmission reQuest – Only for error corrected protocols.

ASCII American Standard Code for Information Interchange assigned to each letter, number and special sign an 8-bit value, limiting it to 256.

Asynchronous Data transmission mode where data bits of each character are transmitted together with additional bits (Start-, Stop-, Parity bit) so that the other side can detect when a new character begins and if the last one was transmitted error free.

AT-Command All commands that a modem understands start with AT (AT for attention)

Auto Answer Modems ability to answer incoming calls automatically after a preset (SO-Register) number of rings.

Baud Step speed unit per second on the phone line or between Modem and Computer. On the serial Interface this is the transmission rate in bits/s. On the phone line usually several bits are transmitted per step.

BBS Bulletin Board System - Mailbox. Software, that is able to send and receive messages and files over modems or several modems.

bis French: second, or second Revision.

BPS Bit rate unit; Bits per Second.

BTZ Federal German Office for Telecommunication Approvals.

CCITT Comité Consultatif International Telephonique et Telegraphique; was replaced with ITU-TSS (International Telecommunications Union).

CD Carrier Detect (data carrier signal was detected).

CEPT Commission Européenne Postale et Telephonique. The CEPT transmission protocol is being used for BTX (Datex-J) e.g.

Class 2 Fax transmission standard.

COM-Port Serial PC interface.

CRC Cyclic redundancy check – A procedure, with which errors are detected during transmission.

CTS/RTS Serial interface control lines according to RS232. In assistance with those lines Hardware-Handshake is.

Data compression Reducing information in less information units. E.G. frequent character sequences are replaced with short codes to be transmitted as replacement.

Data- pump Modem internal module that is responsible for transmission speed.

DCD Data Carrier Detected.

DCE Data Communications Equipment (e.g. a Modem).

DTE Data-Terminal-Equipment - The DTE-speed is the interface speed between Computer and Modem.

DFÜ Date Transmission with Computer

Demodulation Re-conversion of analogue signals to digital signals.

Digital Opposite of analogue – a digit can only have the value of 0 or 1

DSR Data Set Ready – this serial interface control line signals “ready to receive” to the modem.

DTR	Data Terminal Ready - this serial interface control line signals "ready to receive" to the modem.
EPROM	Electrically Programmable Read Only Memory – a permanent memory chip, which can be deleted only with UV light. The modem firmware is often stored in EPROMS.
Error Recognition	Transmission errors caused by poor line quality are recognized with the error correction method (MNP4 or V.42bis) and are corrected through the modem not noticeable for the PC.
FIFO	First-In-First-Out-Puffer (included in UART 16550) is recommended for fast transmission rates and/or multitasking operating systems
Firmware	Modem operating software
Handshake	In order to establish a data communication the two modems have to negotiate a common speed and protocol. This phase is called Handshake.
ITU	International Telecommunications Union new name for the standardizing association CCITT.
LAPM	Link Access Procedure for Modems – an error corrected protocol
LED	Light Emitting Diode.
MNP	Error correction- and date compression protocol.
Modem	MOdulator DEModulator –converts digital computer signals into analogue phone line signals. (Onto the opposite site analogue in digital.)
offline	Modem not connected.
online	Modem connected.
Parity	Test method to check data integrity on asynchronous transmissions
Redundant	Availability of duplicated data
Reset	Return to a defined initial state.
RTS / CTS	Interface control lines for dataflow control.
RXD	Received Data – interface control line for receiving data.
S-Register	Status register – here are the Modem operating parameters stored
SREJ	Selective Reject - SREJ is an error correction-protocol V.42bis expansion.
ter	French: three, and/or third revision.
Terminal-program	Program, that can send an receive date using a modem.
X-Modem	Older, but very common protocol. Often selected as only common choice. MA. Block size only 128 Bytes, low transmission rates, no transmission of file names.
XON/XOFF	See Chapter "Serial Data transmission"
Z-Modem	Standard protocol for computer data transmission, high transmission speed, transmission of file names and paths, reconnection of interrupted transmissions. Z-Modem-G is an advanced, but uncommon version.

FAQs

In the following some questions are described which may occur at installation.

Problem:	The modem does not react on an **ATZ** command.
Possible reason:	The Com port number or the interrupt number, set in the software, does not fit match with the modem interface number. The modem has no power supply or is switched off. The modem is not connected to the PC / PLC interface. (See chapter 3 "Start-Up".)
Problem:	The modem does not dial after the **ATD** dial command and displays an error message.
Possible reason:	The modem is operated at a PABX. The PABX requires that a 0 or 9 must be dialed first or the ground key must be pressed before getting a dial tone. But the modem requires a dial tone before dialing any digit. The solution is to activate blind dialing (dialing without dial tone) with the **ATX3** command or by adding the **>** sign to the dial string. (see chapter 5 “AT Command Set” **ATX** command, **ATD** command.) After dialing the first digit without dial tone, or after executing the ground function, you can reactivate the dial tone detection by adding a **W** to the dial string (Example **ATD0W12345**)
Problem:	The modem does not dial immediately after the **ATD** dial command
Possible reason::	The dialing delay of 30 seconds is active. (See chapter 4.4 "Dialing Delay").
Problem:	The modem can send data, but not receive.
Possible reason:	The setting of the hardware handshake line **DTR** is not correct. In most cases the setting **AT&D2** is correct. (See chapter 4.10.6 "Data Flow Control")
Problem:	The modem does not work with a particular communication program.
Possible reason:	The communication program expects a certain type of dataflow control. The modem setting is not accordingly. Setting the modem to the required dataflow control type solves this problem. Usually the communication program in use allows an initialization string, where the required settings can be added. When starting the program this string is transferred to the modem. (See communications software users manual and chapter 4.10.6 “Data Flow Control”.)

Problem:	The modem can not communicate with another modem or only with failures.
Possible reason:	The other modem uses a communication protocol that the local modem does not understand. The solution is to select the right data compression type and error protocol. (See chapter 4.3 "Error Correction And Data Compression")
Problem:	A telephone connection can not be established.
Possible reason:	The modem uses pulse instead of tone dialing. Change settings with the commands **ATDP** or **ATDT**. You can determine, if your phone uses pulse or tone dialing. If you hear it clattering while dialing, it is pulse dialing. You can change the dialing type with the commands **ATDP** or **ATDT**. (See chapter 5 "AT Command Set", commands **ATDP, ATDT, ATP, ATT**.)