# Creatix WLAN Modem Combo

*CTX712 V.2*

*User Manual*

**Safety instructions for Data-Fax-Modem**
This equipment has been designed and tested in accordance with the requirements of Standard IEC 950 „Safety of Information Technology Equipment, Including Electrical Business Equipment" Extracts from these requirements according Standard IEC 950:

- The FAX-Modem was evaluated for use in maximum ambient temperature of 40 °C.
- The FAX-Modem may only be used in countries where the modem is certified.
- Neither the data transmission cable nor the telephone cable should be connected or disconnected during a thunderstorm.

mv205a0.402uk

# Regulatory Statements

## FCC Certification

The United States Federal Communication Commission and the Canadian Department of Communication have established certain rules governing the use of electronic equipment.

## Part15, Class B

This device complies with Part 15 of the FCC Rules.
Operation is subject to the following two conditions:
(1) This device my not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation. This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

## Caution:

1. This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.
2. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
3. Changes or modifications made to this equipment not expressly approved by *Creatix Polymedia GmbH* may void the FCC authorization to operate this equipment

# Table of Contents

## Chapter 0    INSTALLATION WLAN

## Chapter 1    INTRODUCTION ............................... 1-1

## Chapter 2   AT COMMANDS: DATA MODEM ...... 2-1

# Chapter 3    MODEM MESSAGES ........................ 3-1

# Chapter 4    S-REGISTERS .................................. 4-1

# TECHNICAL INFORMATION................................A-1

# COUNTRY CODE CONVERSION
when using new drivers
Drivers concerned: W2K/XP drivers

# CHAPTER 0    INSTALLATION WLAN



Click on „*Install from a list or a specific location*" and then „*Next>*"
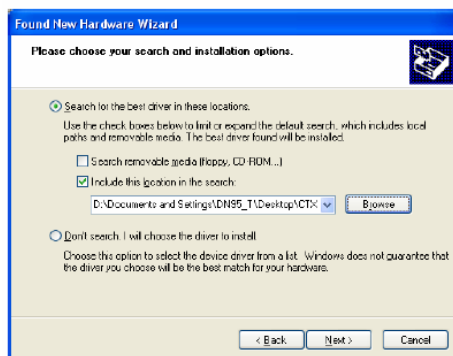


Choose the directory where the driver was unzipped and click on „*Next>*"
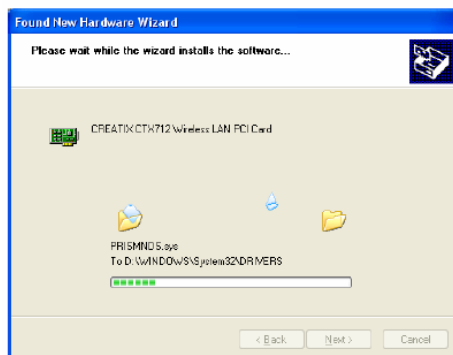


The driver files will be copied.
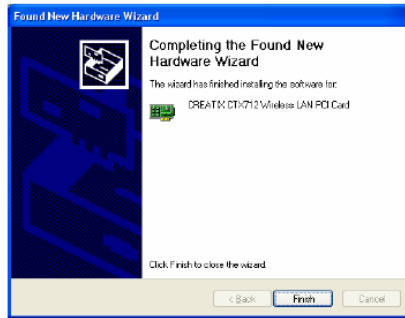
Finish the driver installation with a click on the „*Finish*" button.

### *Configuration of the Wireless LAN Card:*

To configure the WLAN Card go to the "**Network Connections**" < *start – control panel* > and click on the connection of the *"Creatix CTX712 Wireless LAN PCI Card"* with the right mouse button to go to the context menu < *Properties* >.
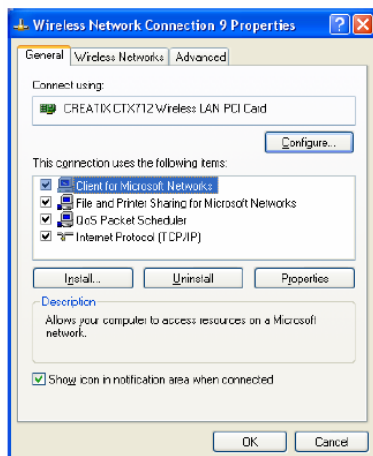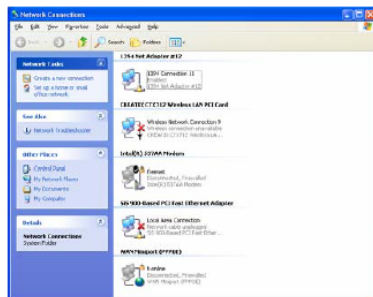




Go to *"Wireless Network"*.
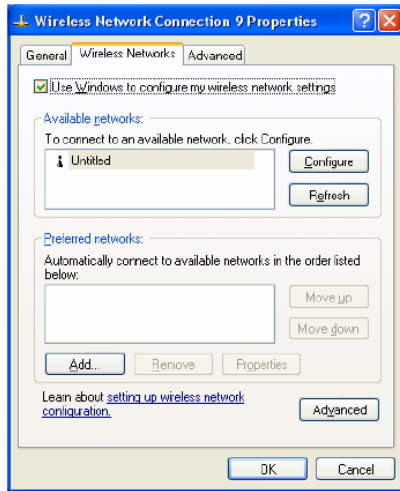
Delete the check mark **"Use Windows to configure my wireless network settings"** to use the configuration file of the card.

**Configuration file** (look at the task bar):
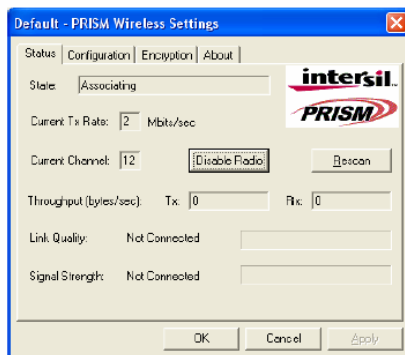


Go to **"Configuration"**.
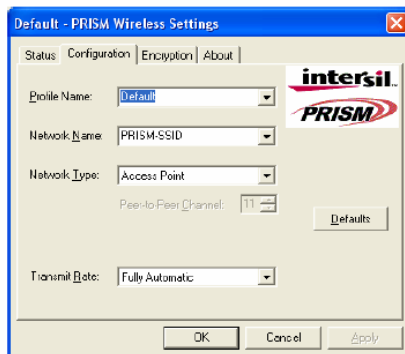


Here you can set your **"Network Name"** and **"Network Type"**.
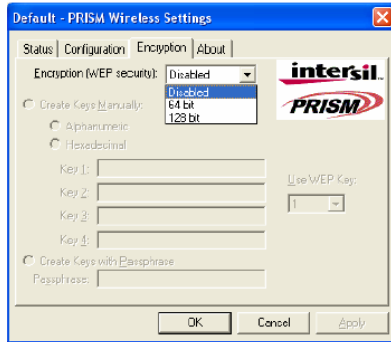
In this Window you can set the **"WEP encryption".**
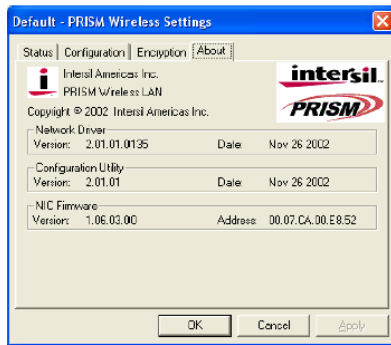


This Window gives you information about the driver version and the firmware.

### Deinstallation of the Wireless LAN card CXT 712A

Go to the Control Panel **"<System – Hardware – Device Manager>"**:
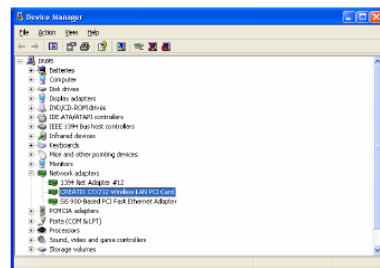


Click on the icon **Creatix CTX712 Wireless LAN PCI Card** under Network Adapters and delete this entry.
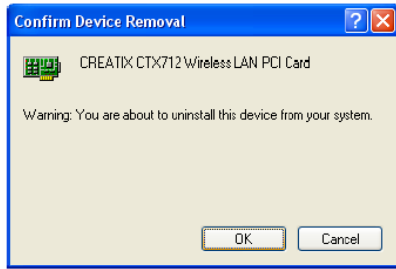
Press the button „*OK*" to remove the driver.
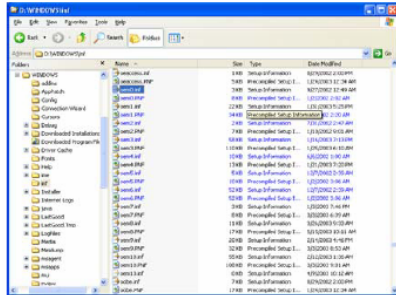


Go into the hidden directory \Windows\Inf.

Check all *"oem\*.inf"* files (they can be opened by double click) to find the oem\*.inf file *"Prismnic.inf"* (Wireless LAN Card):
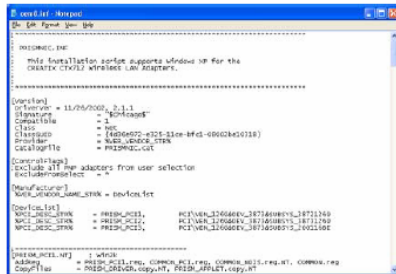


*"Delete"* this file.

After deleting the file shut down your PC to remove the card or restart to install a new update for the driver.

# Chapter 1    INTRODUCTION

The Data Modem you have purchased represents the latest state of the art in data communication; its comprehensive facilities provide all you will need for professional data transfer purposes. Due to the limitation this equipment allows you to receive data with up to 54kbps from your Internet Service Provider (ISP). The maximum transmission speed is 33.6kbps. Fax transmission and reception is working up to 14.4kbps.

## What is a Modem?

The word "Modem" is derived from the terms "MOD-ulator" and "DE-modulator". Putting it more simply, it is a device which modulates digital information into an analogue carrier signal (tones) and demodulates the carrier signals which it receives, changing them back into digital data. This permits the transmission of data along wires, between data terminal equipment (computers, terminals, etc…).

## About this Modem

This modem operates as a full duplex, voice-band modem, where signal transmissions are made in both directions simultaneously and the analogue signals which are transmitted are in the voice-band of the telephone network.
Data transmission between modem and terminal unit is in serial form - in other words, the individual data bits are sent, one after another, along a single transmission or receiving line. At this stage, a word of explanation regarding synchronous and asynchronous data transmission. In the synchronous mode, additional synchronization signals are required, to synchronize the transmission and reception signals. In the asynchronous mode synchronization is by means of "start-bits" and "stop-bits" which mark the beginning and end of each data word. The modem can dial by itself and also react automatically to incoming calls. The information it needs in order to dial a telephone number, together with the various configuration commands, are provided by the respective data terminal equipment via the same serial interface which is used to send the data. In this mode, the system operates with the so-called "AT" command set.

## The 56K Technology

The V.90 modem represents the latest V.90 technology. This allows receive data rates of up to 57.333 kbps over PSTN (public switched telephone network) only in connection with equipment-compatible ISPs (Internet Service Provider): however, due to the limited power levels of the PSTN the receive speed is limited to 54 kbps.

**Figure 1** **Connection** Modem to Modem

Modem ←→ analog Switch ←→ digital Switch ←→ analog Modem

**Figure 2** Connection Modem to Internet Service Provider ISP

Modem ←→ analog Switch ←→ digital Internet Provider ISP

## General Description

- Up to 54 kbps receive data rates in V.90 mode

- Fax send and receive up to 14400 bps

- (Fax group 3, according to V.29, V.27ter, V.17)

- Max. transmission speed up to 33.6 kbps

- Asynchronous communication between modem and computer

- V.42bis data compression

- V.42 and MNP2-4 error correction

- Effective data rate up to115.200 bps (V.34 and V.42bis)

- Number storage for 4 telephone numbers

- Automatic baudrate-adaption up to 115.200 bps

- AT-command set

- Voice capabilities

- Internal speaker

- Win 9x PnP

## Auto-Answering

With the delivered Software you can use your Modem like an answering machine. Voicemail can be recorded over the soundcard. To replay recorded voice or messages you can use a soundcard.

## Installation Instructions

1. Plug in the PCI-Card into a free PCI Slot of your PC.

2. Connect the modem card to the enclosed telephone cable and your analogue telephone connection (RJ11-socket).

## Installation under Windows 95/98

Windows 9x will recognize the modem after a reboot of your PC. Put in the CD with the driver when Windows 9x asks for it and follow the instructions on the screen. Please read the instructions for the installation of new hardware in your Windows-Manual.

## Installation under Windows 9x and ME

After installing the PCI cards start the computer. The computer will display the message -> *New hardware found –> PCI Communication Controller (single)* and the hardware assistant will be started. Search for -> *the best driver for the device (recommended)*. To do this insert the CD supplied with the hardware, which contains the driver. Confirm the messages from the hardware assistant using <u>*Continue*</u> when it finds the driver. The Windows driver database is updated and the assistance can then be completed by clicking on -> *Finish*. Another hardware component -> *Serial Voice Device* will also be found. To install the driver enter the CD drive again. The installation will then be completed with the -> *HAM settings*, where you click on -> *OK* to accept the settings.

## Installation under Windows NT 4.0

Unpack the driver (diskette or Internet) into a temporary folder. After installing the card and starting your computer, click on  -> *Start* -> *Run* using the left mouse button and run the file  -> *setup.exe* from the driver directory (either on the diskette or, if you have downloaded the driver from the Internet, enter the directory into which you unpacked the driver). The installation assistant is now started and will guide you through the installation and install the drivers. Complete the setup process by clicking on -> *Finish*.

To use the modem in a Dial-Up Network, it must be added to the *RAS service -> Start – Settings – Control Panel – Network* (refer to the instructions in the Windows manual).

To uninstall, remove the entry of the card in the *-> Control Panel* under *-> Modems* and uninstall the installation software using *-> Control Panel – Software.*

## Installation under Windows 2000

Unpack the driver (diskette or Internet) into a temporary folder.

After installing the card and starting your computer, the operating system will show the message New hardware *-> PCI Communication Controller (single)* and the hardware assistant will be started. Search for *-> the best driver for the device (recommended)* and enter the directory into which you unpacked the driver. Windows 2000/XP will state that it has not found a digital signature. Continue the installation anyway by clicking on *-> Yes*. Confirm the messages from the hardware assistant using *Continue* when it finds the driver. Finally the hardware assistant will have installed the required software and can be ended by clicking on *-> Finish*. The HAM card should now be available in *-> Control Panel -> Telephone and Modem Options -> Modems*.

=>     *Now you can configure and use the modem with the communications-, fax- and Voiceprograms.*

## Factory settings

To make it easier for you to use your modem, two basic settings have been made at the factory, which are suitable for most of the connections. These settings can be activated with the **"&F"** command. In the fax mode or voice mode, the relevant software will carry out control of modem settings for you.

- For **Data Transmissions** select **AT&F0**. In this condition, the modem will attempt to create an error-corrected connection with data compression, depending on the capability of the remote side.

**1-4** *INTRODUCTION*

# Chapter 2      AT COMMANDS: DATA MODEM

## Guidelines for Using AT Commands

The modem is programmed with AT commands from the data terminal equipment (computer, PC or terminal) and thus also receives instructions to cover automatic dialing. The communications or fax software will carry out most of these operations for you, so that in general circumstances you do not need to have a detailed understanding of the commands which are described below.

The modem must be in Command mode before it can accept commands. In this condition, all the characters sent from the computer are interpreted as commands and, where appropriate, confirmed by a modem message on the screen. When a connection is set up to a remote modem, the modem will switch to data mode and transfer all the characters it receives to the other party.

The modem can be switched from an existing connection, back into the command mode, by using the **Esc Sequence (+++), without** breaking off the connection to the remote modem. In this status, any commands which are entered will not be transferred to the remote modem.

The modem is activated by AT commands, the subsequent value of which will modify the form of the command. Modem messages provide information on the form of the commands.

In the Hayes Command Set, commands are entered by the character sequence **AT (at)** and can also be entered as a list of commands with or without spaces between the individual commands. The "Backspace" key is used for deleting. Commands can be entered in upper-case or lower-case, but all characters for a given command must use the same case. In the command mode, the modem automatically recognizes data frames and data speed.

=>     *AT commands can be transferred to the modem at the following data speeds: 115 200, 57600, 38400, 19200, 9600, 4800, 2400, and 1200 bps*

## Examples of Command Syntax:

**ATX3**<CR>
**ATQ0**<CR>
**ATDT**12345<CR>

Individual commands ending with the <CR> Enter key, can be entered in a different manner with the same effect, by inserting as many spaces as you need, to make the command easier to visualize

**ATX3QODT**12345<CR> or:
**AT X3 Q0 DT** 12345<CR>

**Table 1**     Modem Commands

**Standard Commands**

| | |
|---|---|
| **ATA** | Answer mode: Modem monitors telephone line |
| **A/** | Repeat last command line; entered without "AT" |
| **ATB** | Switching between BELL/CCITT Standards at 300 or 1200 bps |
| **ATD** | Enter automatic dialing |
| **ATE** | Controlling of echo modem commands on screen |
| **ATH** | Break off an existing connection |
| **ATI** | Information on Modem product code |
| **ATL** | Loudspeaker volume control |
| **ATM** | Switch on and off loudspeaker |
| **ATN** | Select Data Rate Handshake |
| **ATO** | Return to Online-mode after entering Esc sequence |
| **ATQ** | Controlling modem messages |
| **ATS** | Read and modify modem register(s) |
| **ATT** | Select Tone dialing |
| **ATV** | Modem message format (verbal or numeric) |
| **ATW** | Directing speed messages |
| **ATX** | Modem function during dialing; modem messages |
| **ATY** | Long Space Disconnect |
| **ATZ** | Modem Reset and Load one of the stored modem profiles |
| **+++** | Escape Sequence to return temporarily to Command mode |
| **AT&C** | Controlling M5 (DCD) Signal at the serial interface |
| **AT&D** | DTR Option |
| **AT&F** | Load the factory setting |
| **AT&G** | Switch on a Guard Tone |
| **AT&K** | Flow Check |
| **AT&R** | Controlling M2 (CTS) and S2 (RTS) Signal at the serial interface |
| **AT&S** | Controlling M1 (DSR) Signal at the serial interface |
| **AT&T** | Modem test functions |
| **AT&V** | Displaying current configuration |
| **AT&W** | Storing Modem settings |
| **AT&Y** | Selecting the configuration which will be active after modem start |
| **AT&Z** | Storing telephone numbers |
| **AT+MS** | Select Modulation |

**Extended MNP- and V.42bis-Befehle**

| | |
|---|---|
| **AT\A** | MNP Block Size |
| **AT\B** | Transmit Break |
| **AT\G** | Set Modem Port Flow Control |
| **AT\J** | bps Rate Adjust Control |
| **AT\K** | Set Break Control |
| **AT\N** | Set Operating Mode |
| **AT\Q** | Set Serial Port Flow Control |

**Extended MNP- and V.42bis-Commands**

| | |
|---|---|
| **AT\T** | Set Inactivity Timer |
| **AT\X** | Set XON/XOFF Pass-Through |
| **AT-J** | Set V.42 Detect Phase |
| **AT%C** | MNP 5 Data Compression Control |
| **AT%E** | Auto Retrain Control |
| **AT%G** | Rate Renegotiations |
| **AT"H** | V.42 bis Compression Control |
| **AT"O** | V.42 bis String Length |

## AT - Attention Code

The AT (Attention) Code, which introduces each command line, can be entered in upper-case or lower-case characters. Several commands (separated by spaces if desired) can be positioned one after another, in one line. A command line must end with the ASCII character which is stored in the S3 or S4 Register (or with both together). The standard value for S3 is Carriage Return (<CR>=13 decimal) and Line Feed (<LF>=10 decimal) for S4. A command line without <CR>,<LF> will remain in the command buffer until <CR>,<LF> is entered, or until the action is broken off with <Cntrl-X>. Once <CR>,<LF> has been received, the modem carries out the commands following the **AT** and answers with an appropriate modem message.
The maximum length of a command line is 40 characters. If the capacity of the command buffer is exceeded, the modem issues an Error message.

=>    *The AT code enables the modem to recognize the speed, parity and character length of the communication program*

## The ESC Sequence

If the modem has established a data connection, you can enter more commands at any time, without breaking off the connection. This is achieved by sending three ASCII characters (S2 Register) from the computer to the modem. The standard setting is the "+" character. In order for this to be interpreted as the ESC sequence, certain time limits must be observed in entering the plus-characters. Before the first and after the last character, a Guard time is required (the standard is 1 second) and the individual characters must not be separated from each other by longer than this time period.

## A - Answer Mode

When the **A** command is entered, the modem switches to the "Off-Hook" condition when ringing appears in the answer mode and takes over control of the telephone line connected. In this way, the modem transmits in the upper frequency band (upper channel).

If further commands are entered after the **A** command before a connection has been made, the modem interrupts the establishment of a connection, switches to command mode and issues a NO CARRIER message.

If no carrier is received from the remote station after the waiting time which is set in the S7 Register, the modem responds with a NO CARRIER message and returns to command mode. If the modem does receive the carrier signal, it issues a CONNECT message and switches to Data mode.

=>     *If the handset is not replaced after the data transmission has been completed, the connection remains online and you will continue to pay for this !*

## A/ - Repeat Last Command Line

The A/ command causes the modem to repeat the command line which is stored in the command buffer, e.g. it will dial again, if the line is busy. This command is entered without AT and no reply is issued.

=>     *A command line remains in the repetition buffer until the modem receives a new command. The data format should not be modified in the meantime.*

## B - BELL/CCITT Standard

The B command permits change-over between CCITT and Bell standards at 300 or 1200 bps. At 300 bps, this command will select between Bell 103 and CCITT V.21, while at 1200 bps it will select between Bell 212A and CCITT V.22.

**ATB0**        CCITT V.22, V.21
**ATB1**        Bell 212A, Bell 103 (factory setting)

=>     *The **B** command refers only to connections at 300 or 1200 bps. All other speeds use the CCITT standard.*

## D - Automatic Dialing and Dialing Parameters

The D command instructs the modem to go on-line and to dial. If this command is entered without parameters, the modem will go on-line in Originate mode. The following characters are authorized in the dialing sequence:

**0 - 9**   The digits of the telephone number

**P, T**    In the Dial command, these parameters switch to pulse-dialing (**P**) or to tone-dialing (**T**) until the other parameter is entered. The standard setting is tone-dialing.

**W**       Dialing tone recognition. When this parameter is entered, the modem will not continue dial until it has recognized the sign that the line is free. This is an advantage in branch exchanges, where it is not always possible to guarantee immediate access to a line.

**,**       Dialing pause (2 sec). This command may not be used in the dialing sequence when the modem is supposed to wait for a new dial-tone. The **W**-Parameter must be used in this case.

**A-D,\*,#** Additional characters when tone-dialing

**S=n**     Dialing number which is stored with **&Zn**

**!**       Call exchange by Flash

**;H**      Modem as automatic dialing device. Here, the dialing sequence is terminated by a semi-colon, followed by the **H** command. The modem goes off-line after dialing and you can take over the conversation using a telephone. The handset must be lifted **during** the dialing process.

**Example** of how to set up a Dial Command

**ATD T**0, 02212971
With this, a private automatic branch exchange using tone-dialing dials zero, in order to obtain an exchange line. The modem then waits two seconds to dial the rest of the telephone number.

**Example** of the Automatic Dialing Function

**ATD T**0, 02212971;**H**
If you lift the handset **during** the dialing process, you can take over the connection yourself.

=> *Where appropriate, ask the manufacturer of your private automatic branch ex-change what specific features need to be taken into account in the dialing procedure*

=> *If the handset is not replaced after the data transmission has been completed, the connection remains made and you will continue to pay for this!*

## E – Echo Function

The E command determines whether the modem will issue an echo of the command which is entered.

**ATE0**    Echo disabled
**ATE1**    Echo enabled (factory setting)

## H – Switch Hook Control (Replace Handset) – Go "On Hook"

The **H** command will break off the existing telephone line connection (the modem "hangs up") and the connection to the remote modem is cut off. After the H command, any other commands in the same line are ignored.

=>    *This command can only be entered after an existing data link has been quitted by using the **Esc** sequence.*

## I – Firmware Information

**ATI0**    Report product code
**ATI1**    Modem chip firmware version #
**ATI2**    Verifies ROM checksum
**ATI3**    Reports chipset name
**ATI4**    Reserved
**ATI6**    Country Code

## L – Volume Level

The loudspeaker enables you to follow acoustically as the connection is established and data are transmitted.

**ATL0,1**  Low speaker volume
**ATL2**    Medium speaker volume (factory setting)
**ATL3**    High speaker volume

## M – Switching the Loudspeaker On and Off

**ATM0**    Speaker always OFF
**ATM1**    Speaker on until carrier present (factory setting)
**ATM2**    Speaker always ON
**ATM3**    Speaker OFF during dialing, and on until carrier

## N – Recognizing Type of Modulation
This command commands the automatic recognition of the type of modulation.

**ATN0**    When originating or answering, connect only at the data rates specified by the modulation.

**ATN1**    When originating or answering, begin handshaking at the modulation data rate. If the remote modem does not support the specified modulation data rate, fall down in data rate or modulation to the highest compatible data rate.(factory settings)


## O – Return to On-Line Operation
The O command causes the modem to return to Online mode, which had been left temporarily, using the Esc sequence. With the remote modems still online, you can continue data transmission.


## Q – Modem Messages On / Off
**ATQ0**    Result codes enabled(factory setting)

**ATQ1**    Result codes disabled


## S – Reading and Modifying Registers
This command gives access to the internal modem registers. See chapter 4 for details of the possible values.

**ATSn=v**  This sets Register n to the (decimal) value v

**ATSn=v?**  This sets Register n to the (decimal) value v and sends the new value for checking

**ATSn?**  This reads Register n and gives its value in decimal form


## V – Verbal or Numeric Modem Messages
The V command determines the type of message which the modem returns to the computer.

**ATV0**    Numeric form

**ATV1**    Verbose (text) form (factory setting)

## W – Controlling Connect Messages

This command controls the format of CONNECT messages.

**ATW0,1**  CONNECT result code reports DTE speed

**ATW2**  CONNECT result code reports DCE speed

**ATW3**  CONNECT result code reports DTE data rate, modulation mode, error correction, data compression, DCE transmitter speed and DCE receiver speed when the mode is configured for verbose **V1** (text) response codes. For numeric responses **V0**, the modem responds with the **W0** numeric response codes. The verbose response codes use the following format:

CONNECT (DTE data rate)/(modulation)/(error correction)/ (data compression)/TX=(DCE transmit data rate)/RX=(DTE receive data rate)

Modulation types include:
V21, V22, V22B, V23C, V32, V32B, V32B, V34

Error correction types include: NONE, LAPM, MNP

Data compression types include: NONE, V42B, MNP5

**For example***:* CONNECT 115200/V34/LAPM/V42B/TX=28800/RX=28000

**ATW4**  CONNECT result code reports DTE protocol, data compression, and DTE data rate when the mode is configured for verbose **V1** (text) response codes. For numeric responses **V0**, the modem responds with the **WO** numeric response codes. The verbose response codes use the following format: (DTE protocol) (date compression) (line speed)

Error correction types include: NONE, LAPM, MNP

Data compression types include: NONE, V42B, MNP5

**For example:** PROTOCOL: LAPM; COMPRESSION: V42B; CONNECT 33,600

## X – Result Code Type/Call Progress

This command determines which modem result codes are enabled. Additionally, this command specifies whether busy and dial tone detection are enabled or disabled..

**ATX0**  Result codes 0-4 enabled. Busy and dial tone detect disabled.

**ATX1**  Result codes 0-5, 10 and above enabled. Busy and dial tone detect disabled.

**ATX2**  Result codes 0-6, 10 and above enabled. Busy detect disabled and dial tone detect enabled.

**ATX3**  Result codes 0-5, 7, 10 and above enabled. Busy detect enabled and dial tone detect disabled.

**ATX4**  Result codes 0-7, 10 and above enabled. Busy and dial tone detect enabled (factory setting).


## Y – Long Space Disconnect

This command determines whether the modem disconnects after receiving 1.6 seconds of silence and whether the modem sends a period of silence to the remote modem before disconnecting.

**ATY0**  Disables long space disconnect (factory setting)

**ATY1**  Enables long space disconnect. The modem disconnects after receiving 1.6 seconds of silence from the remote modem. Additionally, after receiving an **ATH0** command, the modem sends at least 4 seconds of silence before hanging up.


## Z – Reset Modem/Recall Stored Profile

This command causes the modem to go on-hook (hang-up), perform a warm reset, and load user-configuration profile 'n' (previously stored in the NVRAM) into the active profile. The **Zn** command must be the last command in command string, as it causes all subsequent commands to be ignored.

**ATZ0**  Resets the modem and recalls user profile 0.

**ATZ1**  Resets the modem and recalls user profile 1.


## &C – DCD (Data Carrier Detect) Option

This command controls how to modem functions in relation to the DCD or RLSD signal.

**&C0**  State of carrier from remote modem is ignored. DCD is always on.

**&C1**  State of carrier from remote modem is tracked. DCD reflects the state of the received carrier.

## &D – DTR (Data Terminal Ready) Option

This command controls how the modem responds to DTR. After toggling DTR, the host should wait 200 ms before modifying the UART registers or sending a new command to the modem. This is done because the modem does not send an 'OK' message to indicate it has performed the requested function.

**AT&D0**    In asynchronous mode (**&Q0**), the modem ignores DTR.

**AT&D1**    The modem switches from data mode to command mode when an on-to-off transition of DTR occurs.

**AT&D2**    An on-to-off transition of DTR causes the modem to go on-hook (hang-up). While DTR is off, auto-answer is disabled.

**AT&D3**    An on-to-off transition of DTR re-initializes the modem. The re-initialize procedure performs the same function as a power-up reset, except that the UART registers are not reconfigured.

## &F – Loading the Factory Settings

This command loads command defaults and S-Register factory defaults into the active configuration and configures the modem for data mode.

### A Selection of &F0 Factory Settings

**E1**    Echo enabled

**L2**    Middle speaker volume

**M1**    Speaker on until carrier present

**Q0**    Result codes enabled

**V1**    Verbose (text) form

**Y0**    Disables long space disconnect

**X4**    Result codes 0-5, 7, 10 and above enabled. Busy detect enabled and dial tone detect diaabled

**&C1**    State of carrier from remote modem is tracked. DCD reflects the state of the received carrier.

**&G0**    Guard tone disabled

**&R1**    RS always On

**&T5**    Denies RDL request from remote modem

**S0=0**    No automatic answer

**\N3**    V.42 - Auto-Reliable Mode

=>    *(Further settings are covered by the descriptions of the individual Commands and Registers).*

### &G – Guard Tone

This command controls whether the modem sends out guard tones while connected to a remote modem (for ITU-T V.22 bis {1200 bps} and V.22 bis {2400 bps} connections only). Guard tones are sent by the answer modem to disable Central Office echo cancelers.

**AT&G0**   Guard tone disabled (factory setting)
**AT&G1**   550 Hz guard tone enabled
**AT&G2**   1800 Hz guard tone enabled


### &K – Select Serial Port Flow Control

This command specifies the DTE-to-modem flow control. Software flow control uses the characters XOFF (13h) and XON (11h) to stop and start data transmission, respectively, both to and from the DTE. Bi-directional hardware flow control uses RTS/CTS to stop and start data from the modem

**AT&K0**   Disables flow control
**AT&K3**   Bi-directional hardware flow control - RTS/CTS
**AT&K4**   XON/XOFF software flow control


### &S – DSR (Data Set Ready)

This command controls how the modem treats the DSR signal.

**&S0**      DSR circuit always on
**&S1**      DSR circuit is on during handshaking, off in test or idle modes. DSR is off when the carrier is lost.


### &T – Data Mode Self-Test Command

This command is used in data mode to initiate and terminate loopback tests for testing modem-to-modem and DTE-to-modem data communication integrity.

**AT&T0**   Terminate test in progress
**AT&T1**   Local analog loopback.
**AT&T4**   Grants RDL request from remote modem
**AT&T5**   Denies RDL request from remote modem
**AT&T6**   Remote digital loopback
**AT&T7**   Remote digital loopback with self-test
**AT&T8**   Local analog loopback with self-test

=> *You can use the Test Timer (Register 18) to end a test loop; alternatively, once you have entered the Esc sequence (+++), you can enter the command* **AT&T0***.*

## &V – View Active Configuration and Stored Profiles

This command causes the modem to display the command and S-Register information contained in the active user profile and in one or two stored profiles. The command **&V0** displays the active profile and the stored profile 0; **&V1** displays the active profile and the stored profile 1. The information in the active profile is stored into the user profiles with the **&Wn** command. **&W0** stores the active profile into the stored profile 0; **&W1**, the stored profile 1.

**&V0**       Stored profile 0
**&V1**       Stored profile 1


**Table 2**    Current Modem Configuration (Example)

at&v1

```
ACTIVE PROFILE:
B1 E1 L2 M1 N1 T Q0 V1 W0 X4 Y0 &C1 &D2 &G0 &J0 &P0 &Q0 &S0 &U0 &Y0
%A013 %C0 %E1 %G1 \A3 \C0 \G0 \J0 \K5 \N3 \Q3 \T000 \X0 -C1 -J1 "H3 "O032
S00:000 S01:000 S02:043 S03:013 S04:010 S05:008 S06:003 S07:060 S08:002
S09:006 S10:014 S11:090 S12:050 S18:000 S25:005 S30:000 S33:000 S37:000

STORED PROFILE 1:
B1 E1 L2 M1 N1 T Q0 V1 W0 X4 Y0 &C1 &D2 &G0 &J0 &P0 &Q0 &S0 &U0
%A013 %C0 %E1 %G1 \A3 \C0 \G0 \J0 \K5 \N3 \Q3 \T000 \X0 -C1 -J1 "H3 "O032
S00:000 S02:043 S06:003 S07:060 S08:002 S09:006 S10:014
S11:090 S12:050 S18:000 S25:005 S30:000 S33:000 S37:000

TELEPHONE NUMBERS: (max 30 characters)
&Z0 =
&Z1 =
&Z2 =
&Z3 =
```


## &W – Storing a set Profile

The **&Wn** command is used to store a number of values of the S Register's current configuration profile, in the non-volatile NVRAM. You can store two different pro-files (**n** = 0, 1) and load these again by using the **Z** command.


## &Y – Selecting a Start Configuration

The **&Yn** command is used to determine which of the non-volatile stored profiles (**&W** command) will be active when the unit is switched on. The **n** parameter (**n** = 0, 1) is used to select the profile required (factory setting is 0).

## &Z – Telephone Number Storage

The modem can store up to 4 telephone numbers by using the **AT&Zn=*x*** command (***n*** = 0-3). These can be dialed automatically by the command **ATDS=*n***. Telephone numbers must not be more than 45 characters in length (digits + dialing parameters).

For example:        **AT&Z2=T06897 123456**

The telephone number T (tone dialing) **06897 123456** is stored in memory **2**.


## +MS – Select Modulation

This command sets the type of modulation used and the send and receive speeds. Settings for **Bn**, +MS=m, **Nn** and **S37** determine the allowable modem connections. **Nn** performs the same function as the +MS=m <automode> parameter. **S37** performs the same function as the +MS=m <max rate> parameter.
V.34 modulation connections can be symmetrical or asymmetrical. In symmetrical connections, the transmit and receive speeds are the same; in asymmetrical, they are different. Modems can be configured by the +MS=m command to support only asymmetrical or symmetrical connections. The factory default is for a 33,600-bps asymmetrical connection. Note that the transmitter speed and receiver speeds typically are different for most V.34 connections over the PSTN.
The **+MS** command sets the modulation speeds in the V.34 chipsets; however, to set the modulation to either V.22 or Bell 212, the **B0** or **B1** command also must be sent. To set the modulation type to ITU-T V.22, send the **B0** command; to set the modulation type to Bell 212, send **B1**. These commands can be typed before or after the **+MS** command. For example, to set the modulation to ITU-T V.22:

+MS = V22, 1, 1200, 1200; B0

To check the settings for the +MS command, type AT+MS?

*m=<carrier>, <automode>, <min rate>, <max rate>*

Defaults: m= V90, 1, 0, 0

*<carrier>* The eight-digit string parameter specifies the type of modulation used. Approved codes are shown in the following table. The modem can switch automatically between some types.

**<carrier> Description**
V21 V.21 300 bps
V22 V.22 1200 bps
V22B V.22 bis 1200 and 2400 bps

V23C    V.23, with constant carrier, 1200 bps forward and 300 bps reverse
V32     V.32 4800 and 9600 bps
V32B    V.32 bis 7200, 9600, 12,200, and 14,400 bps
V34     V.34 asymmetrical connections: 2400, 4800, 7200, 9600, 12,200, 14,400, 16,800, 19,200, 21,600, 24,000, 26,400, 28,800, 31,200, and 33,600 bps
V34S    V.34 symmetrical-only connections: 2400, 4800, 7200, 9600, 12,200, 14,400, 16,800, 19,200, 21,600, 24,000, 26,400, 28,800, 31,200, and 33,600 bps
V34B    V.34 extended asymmetrical connections: 2400, 4800, 7200, 9600, 12,200, 14,400, 16,800, 19,200, 21,600, 24,000, 26,400, 28,800, 31,200, and 33,600 bps
V34BS   V.34 extended symmetrical connections: 2400, 4800, 7200, 9600, 12,200, 14,400, 16,800, 19,200, 21,600, 24,000, 26,400, 28,800, 31,200, and 33,600 bps
V90     56kbps V.90 asymmetrical connections (transmit): 4800, 7200, 9600, 12,000, 14,400, 16,800, 19,200, 21,600, 24,000, 26,400, 28,800, and 31,200 bps, 56kbps V.90 asymmetrical connections (receive): 33,333, 37,333, 41,333, 42,667, 44,000, 45,333, 46,667, 48,000, 49,333, 50,667, 52,000 and 53,333 bps

## +MS – Modulation Selection:

**<automode>** When enabled this parameter allows the modem to negotiate modulation speeds automatically (if an automatic value is defined for that particular modulation). This feature is also controlled by the **Nn** AT command. The automode setting is based on which command, **Nn** or +MS=m, was issued last.

Range: <automode>=0, 1
Default:<automode>=1
<automode> = 0 Disabled
<automode> = 1 Enabled

**<min rate>** This parameter specifies the lowest data transfer rate at which the modem may establish a carrier signal connection.
Range:    <min rate> = 0, 300, 1200, 2400, 4800, 7200, 9600, 12,200, 14,400, 16,800, 19,200, 21,600, 24,000, 26,400, 28,800, 31,200, 33,600, bps
Default:   <min rate> = 0

<min rate>   = 0 Minimum allowed data rate
            -<automode> = 1
            Lowest data rate = 300 bps
            -<automode> = 0
            Lowest data rate = (Lowest modulation data rate)
<min rate>   ≠ 0 Lowest permitted connection rate

**<max rate>** This parameter sets the highest speed at which the modem may establish a connection. This feature is also controlled by the **S37** S-Register. The <max rate> setting is based on which command, **S37** or +MS=m, was issued last Range:
<max rate>   = 0, 300, 1200, 2400, 4800, 7200, 9600, 12,200, 14,400, 16,800, 19,200, 21,600, 24,000, 26,400, 28,800, 31,200, 33,333, 33,600, 37,333, 41,333, 42,666, 44,000, 45,333, 46,666, 48,800, 49,333, 50,666, 52,000, 53,333, 54,666*, 56,000*, and 57,333* bps

Default: <max rate> = 0

<max rate>   = 0 Maximum allowed data rate:
            - If the maximum modulation data rate is less than or equal to the DTE data rate, then the highest data rate is the highest modulation  data rate.
            - If the maximum modulation data rate is greater than the DTE data rate, then the highest data rate is the modulation data rate equal to or just below the DTE data rate.
<max rate>   ≠ 0 Highest permitted data rate


## +MS – Modulation Selection

**Examples (DTE data rate = 115,200 bps): Speed**
| | | |
|---|---|---|
| +MS = V32B, 1, 9600, 14400 | 9600 | - 14400 |
| +MS = V34, 1, 0, 0 | 300 | - 28800 |
| +MS = V34, 1, 300, 28800 | 300 | - 28800 |
| +MS = V34, 1, 9600, 28800 | 9600 | - 28800 |
| +MS = V34, 1, 28800, 28800 | 28800 | - only |
| +MS = V34, 0, 19200, 26400 | 19200 | - 26400 |
| +MS = V32, 1, 0, 0 | 300 | - 9600 |
| +MS = V32, 0, 0, 0 | 4800 | - 9600 |
| +MS = V90, 1, 0, 0 | 0 | - 57333* |

*Current download speeds are limited to 53,333 bps due to the limited power levels of the PSTN.

## \A – MNP Block Size

This command specifies the maximum number of data bytes in an MNP data frame. A smaller size may improve throughput on high-impairment (noisy) telephone lines.

**AT\A0**   Maximum block size is 64 bytes
**AT\A1**   Maximum block size is 128 bytes
**AT\A2**   Maximum block size is 192 bytes
**AT\A3**   Maximum block size is 256 bytes (factory setting)


## \B – Sending a Break Signal

The **\B** command is used to send a Break signal to the remote modem (see **\K** command). In order to enter the **\B** command, you must first return from the existing data connection to the Command mode, using the **Esc** sequence. The Break signal is fixed at 300 ms.


## \C – Set Auto-Reliable Buffer

In auto-reliable mode (**\N3**), this command determines the fallback method and enables data buffering. The settings for this command are used by the modem during the V.42 detection phase.

**AT\C0**   Does not buffer data (factory settings)
**AT\C1**   Buffers data for four seconds or until 200 characters have been buffered or the SYN character is detected, then switches to reliable mode. If the buffer fills, data is passed to the serial port.
**AT\C2**   Does not buffer data. Switches to buffer (normal) mode upon receipt of autoreliable fallback character and passes it to serial port. This feature allows non-V.42. modems to connect immediately to a V.42 modem without data loss.


## \G – Set Modem Port Flow Check

In buffer (normal) mode (either) **\N0** or after fallback), this command enables modem-to-modem flow control using XOFF (13h) to stop and XON (11h) to start transmission between modems.

**AT\G0**   Disables port flow control (factory setting)
**AT\G1**   Set port flow control to XON/XOFF

## \J – bps Rate Adjust Control

If this command is enabled, the serial port speed automatically changes to the modem-connection speed. This forces the user to change the DTE-to-modem bps rate, if needed. If the command is disabled, the serial port speed is independent of the connection speed, which allows much greater throughput when using error connection and data compression

**AT\J0**    Turns off feature
**AT\J1**    Turns on feature

## \K – Set Break Control

Defines what action the modem takes when a break (attention signal) is sent or received, as described below.

**Table 2**  Break Control

| | Break by Computer in Data Mode | Break by Computer in ESC-Command Mode | Break by Remote Modem in "Normal" Connection |
|---|---|---|---|
| **\K0** | No break to remote modem; go into ESC command mode | Delete buffer send Break immediately to remote modem | Delete buffer and send Break to computer |
| **\K1** | Delete buffer send break to remote modem | as **\K0** | Delete buffer and send Break to computer |
| **\K2** | as **\K0** | Send Break immediately to remote modem | Send Break immediately to computer |
| **\K3** | Send Break immediately to remote modem | as **\K2** | as **\K2** |
| **\K4** | as **\K0** | Send Break in Data sequence to remote modem | Send Break in Data sequence to computer |
| **\K5\*** | Send Break in Data sequence to remote modem | as **\K4** | as **\K4** |

## \N – Set Operating Mode

Determines the type of connection attempted by the modem.

**AT\N0,1** Buffer (Normal) Mode – no data compression or error correction, but uses speed buffering.

**AT\N2** MNP Reliable Mode – the modem attempts to negotiate an MNP error-correction 'reliable' link, hanging up if it fails.

**AT\N3** V.42 Auto-Reliable Mode – if V.42 detection is enabled (**-Jn**), a LAPM or MNP link can be detected and negotiated; otherwise, only LAPM is attempted. If configured for **-J0** and a protocol connection is not made, the modem hangs up. If configured for **-J1** and a protocol connection is not made, the modem falls back to speed buffering mode.

**AT\N4** V.42 Reliable Mode – the modem attempts to negotiate LAPM error correction, hanging up if it fails

=>    *Some types of modem will not accept an MNP connection. In such cases, use the \N0 command (Buffering) or the \N1 command (Direct mode).*

## \Q – Set Serial Port Flow Control

This command specifies the DTE-to-modem flow control. Software flow control uses the XOFF (13h) command to stop and the XON (11h) characters to start data transmission, both to and from DTE. Undirectional hardware flow control uses the CTS control line to stop or start data from the DTE only, while bi-directional hardware flow control also uses the RTS control to stop or start data from the modem.

**AT-Q0**    Disables flow control
**AT-Q1**    XON/XOFF software flow control
**AT-Q2**    Undirectional hardware flow control – CTS
**AT-Q3**    Bi-directional hardware flow control – RTS/CTS

=>    *The advantage of the RTS/CTS-Hardware flow control in opposite of the XON/ XOFF Software flow control is the short reactiontime. The reactiontime is for the binary date transfer, which can contain XON/XOFF-settings, absolute necessary.*

## \T – Set Inactivity Timer

During a buffer (normal) or reliable connection, if no data is sent or received within the inactivity time period, the link is disconnected. The default, '0', disables this feature.

**AT\T0-90** Length in minutes
**AT\T0** Disables inactivity timer (factory setting)

## \X – Set XON/XOFF Pass Through

If software flow control is enabled (**\Q1**), this command defines whether the XON (11h) and XOFF (13h) characters received from the DTE are sent to remote modem. In addition, if the modem port flow control is enabled (**\G1**) in normal mode, the command specifies whether the XON and XOFF characters received from the remote modem are sent to the DTE. In both cases, flow control operation is not affected.

**AT\X0** Processes flow control characters (factory setting)
**AT\X1** Processes flow control characters and passes them through to the local or remote so they can process the characters.

## -J — Set V.42 Detect Phase

In V.42 modes (**\N3, \N4**) this command specifies whether the modem detects V.42, MNP, or no error-connection protocols from the remote modem and changes to the appropriate mode. Otherwise, only V.42 is attempted.

**AT-J0** Disables V.42 detect phase
**AT-J1** Enables V.42 detect phase (factory setting)

## %C – MNP 5 Data Compression Control

This command controls whether the data sent during the MNP frames is compressed using MNP Class 5 compression standard. MNP 5 data compression can improve throughput by as much as 150%.

**AT%C0** No compression
**AT%C1** MNP Class 5 compression (factory setting)

=> *Where files selected for transmission are compressed, the speed of transmission is reduced with MNP5 or V.42 Protocols.*

## %E – Auto-Retrain Control

This command controls whether the modem automatically initiates a modem retrain whenever the received data signal quality falls below a threshold that may affect data reliability. The value for 'n' is stored in the NVRAM.

**AT%E0**  Disabled
**AT%E1**  Enabled (factory setting)

## %G — Rate Renegotiations

This command selects whether the modem automatically initiates a change to higher speed or lower speed depending on received signal quality (that is, rate negotiation). The modem always responds to any rate change initiated by the remote modem.

**AT%G0**  Disabled
**AT%G1**  Enabled (factory setting)

## "H — V.42 bis Compression Control

This command specifies whether the data in the LAPM frames are compressed using V.42 bis data compression. This can improve throughput by as much as 400%. Compression can be negotiated to operate in one direction or both.

**AT"H0**  Disables V.42 bis
**AT"H1**  Enables V.42 bis only when transmitting data
**AT"H2**  Enables V.42 bis only when receiving data
**AT"H3**  Enables V.42 bis for both transmitting and receiving data
(factory setting)

## "O — V.42 bis String Length

This command specifies the maximum number of characters that can be compressed into one V.42 bis code word. The default value of 32 optimizes throughput for most file types. (6-250 = Number of characters); (*n*=32; usual number of characters).

# Chapter 3   MODEM MESSAGES

The modem responds to AT commands with *Modem Messages*. You can control their format with the **V** command verbal (**ATV1**) or numeric (**ATV0**).
In addition, the modem issues *Connection Messages*, when it recognizes activities on the telephone line. The **X** command determines which messages are authorized here.
Messages regarding Modulation, Error correction, Datacompression and Data rate are controlled via the **W3-**command. The following table gives an overview of the possible messages.

**Table 3      DTE-Modem Data Rate Response Codes**

| Numeric Code | Verbose Code |
|---|---|
| 0 | OK |
| 1 | CONNECT |
| 2 | RING |
| 3 | NO CARRIER |
| 4 | ERROR |
| 5 | CONNECT 1200 |
| 6 | NO DIAL TONE |
| 7 | BUSY |
| 8 | NO ANSWER |
| 23 | CONNECT 75/1200 |
| 22 | CONNECT 1200/75 |
| 10 | CONNECT 2400 |
| 11 | CONNECT 4800 |
| 24 | CONNECT 7200 |
| 12 | CONNECT 9600 |
| 25 | CONNECT 12000 |
| 13 | CONNECT 14400 |
| 59 | CONNECT 16800 |
| 14 | CONNECT 19200 |
| 61 | CONNECT 21600 |
| 62 | CONNECT 24000 |
| 63 | CONNECT 26400 |

| Numeric Code | Verbose Code |
| --- | --- |
| 64 | CONNECT 28800 |
| 65 | CONNECT 31200 |
| 33 | CONNECT 33333 |
| 66 | CONNECT 33600 |
| 34 | CONNECT 37333 |
| 28 | CONNECT 38400 |
| 35 | CONNECT 41333 |
| 36 | CONNECT 42666 |
| 37 | CONNECT 44000 |
| 38 | CONNECT 45333 |
| 39 | CONNECT 46666 |
| 42 | CONNECT 48000 |
| 43 | CONNECT 49333 |
| 53 | CONNECT 50666 |
| 54 | CONNECT 52000 |
| 55 | CONNECT 53333 |
| 56 | CONNECT 54666 |
| 57 | CONNECT 56000 |
| 58 | CONNECT 57333 |
| 18 | CONNECT 57600 |
| 31 | CONNECT 115200 |
| 45 | RINGBACK |
| See Note | CONNECT (DTE data rate) / (modulation) / (error correction) / (data compression) / TX: (DCE transmit data rate) / RX: (DCE receive data rate) |

*Note:*
This verbose response code is used to evaluate the modem connection and is enabled by the **W3** AT command. All other 'CONNECT' messages are used for **W0- W2** AT commands. When the modem is configured for text response **V1**, the **W3** verbose response codes provide information about the DTE data rate, connection modulation, error correction protocol, data compression, and modem-to-modem data rate. When the modem is configured for **W3** and numeric responses **V0**, the modem responds as if set up for **W0**.

# Chapter 4   S-REGISTERS

The modem has a series of S-Registers, in which the active configuration are stored. The contents of some Registers are stored in a non-volatile memory (NVRAM), which can be interrogated with **Z**, **&Y** and **&W** commands. The syntax for entering and requesting Register values is given in the description of the **S** command. The values of most of the Registers can be modified by using AT commands.

## Table 4  S-Registers (Summary)

| Register | Range | Default. | Description |
|---|---|---|---|
| S0* | 0-9 ring characters | 0 | Ring characters before modem answers |
| S1 | - | 0 | Ring character counter |
| S2* | 0-127 ASCII | 43 | Esc sequence character |
| S3 | 0-127 ASCII | 13 | Carriage return character |
| S4 | 0-127 ASCII | 10 | Line feed character |
| S5 | 0–127 ASCII | 08 | Backspace character |
| S6* | 3–6 sec | 3 | Dial tone waiting time |
| S7* | 1–255 sec | 60 | Waiting time for carrier after dialing |
| S8* | 0–10 sec | 2 | Pause character comma |
| S9* | 1–255 1/10 sec | 6 | Answer time after carrier recognition |
| S10* | 1–99 1/10 sec | 14 | Delay: carrier loss to "hanging up" |
| S12* | 0-255 1/50 sec | 50 | Guard time for Esc sequence |
| S14 | Bit-mapped | 138 (8Ah) | General options |
| S16 | Bit-mapped | 0 | Modem test options |
| S18* | 0–255 sec | 0 | Test Timer |
| S21 | Bit-mapped | 48 (30h) | V.24/General options |
| S22 | Bit-mapped | 102 (60h) | Loudspeaker/modem messages |
| S23 | Bit-mapped | - | General options |
| S25* | 0–255 sec; 1/100 sec | 5 | DTR delay time |
| S27 | Bit-mapped | 64 (40h) | General options |
| S30* | 0–90 sec | 0 | Inactivity timer for "hanging up" |
| S33* | 0–255 sec | 0 | Sleep Mode Timer |
| S37 | 0 | - | Type of modulation (Line-Speed) |

*Register values are stored with &W in the non-volatile NVRAM memory

### S0 – Number of Ring Characters before Modem engages

If S0-Register is set to S0 = 0, automatic answering is switched OFF and the modem does not go on-line. If S0 = 1, the modem will go on-line at the first ringing sign, or character.

**Range:** 0-9 ringing characters; factory setting: 0

### S1 – Ring Character Counter

The value of this Register is increased by 1 with each ring which is recognized. It is deleted when pauses exceed 11s.

**Range:** 0-255 ring characters; factory setting: 0; Read only register

### S2 – Esc Sequence Character

ASCII value of the character defined as the Esc sequence, to change from data mode to command mode. The Esc sequence is switched off where this value exceeds 127.

**Range:** 0-255; factory setting: 43 (ASCII+, "plus" sign)

### S3 – Carriage Return Character

ASCII value of the Carriage Return character (<CR>Carriage Return) ends the command lines and modem messages.

**Range:** 0-127; factory setting: 13 (ASCII CR, Carriage Return)

### S4 – Line Feed Character

ASCII value of the Line Feed character (<LF> Line Feed). The modem sends this character after <CR> to finish verbal modem messages in asynchronous operating mode.

**Range:** 0-127; factory setting: 10 (ASCII LF, Line Feed)

### S5 – Backspace Character

ASCII value for Backspace. Entering this will delete the character to the left of the cursor (and the last character in the command memory) and the cursor moves one space backwards.

**Range:** 0-127, factory setting: 8 (ASCII Backspace)

## S6 – Waiting Time for Dial Tone

The value of the S6 Register determines when the modem will begin to dial after "going off-hook" (or after recognizing the W parameter in Dialing command mode). The **X** command controls the effect of the S6 Register. For **X0**, **X1** or **X3**, the modem waits for the specified period, even if the dial tone occurs earlier. You can enter any value between 0 and 255 sec in this Register; however, the modem will always remain in the allowed range.

**Range:** 3–6 seconds; factory setting: 3 sec

## S7 – Waiting for Carrier Signal

Where the extended mode commands **X3** or **X4** are active (**X3** is the factory setting), the modem waits in Originate mode until the "Free" character is recognized (the other connection is being called). The value of the S7 Register determines the duration of the waiting period. In addition, the value of the S7 Register also determines how long the modem will wait for a carrier signal from the remote modem, before it "hangs up". Since the modem also waits for a carrier signal, if it does not recognize a "Free" tone, the total waiting time can be twice as long as the value set in the S7 Register.

When answering, the Register value represents only the waiting time for carrier-tone recognition, since the "Free" character is of no importance here. Further, the value of the S7 Register determines the waiting time for a subsequent dialing tone (with no affect on the waiting time after the modem has "lifted the handset"), where the **W** parameter is in Dial command mode. The subsequent dialing tone is used in telephone systems, where a number is dialed beforehand to call the exchange.

**Range:** 0-255 sec; factory setting: 60 sec

## S8 – Pause Time after Comma

If a comma is included in the Dial command, the modem will pause when dialing, when it reaches this character. The length of this pause is determined by S8.

**Range:** 0-10 sec; factory setting: 2 sec

## S9 – Answer Time after Carrier Recognition

The period of time, during which the carrier from the remote station must be present, before the modem goes on-line. A higher value decreases the risk of an incorrect interpretation.

**Range:** 1-255 1/10 sec; factory setting: 6 (0.6 s)

## S10 – Delay between Carrier Loss and Hanging Up

The period of time, during which the modem waits after carrier loss, before it "hangs up". This allows for a temporary loss of the carrier. The value must be greater than the value of the S9 Register, so that the modem does not "hang up" before recognizing the carrier.

**Range:** 1-99 1/10 sec; factory setting: 14 (1.4 s)

## S12 – Guard Time for Esc Sequence

The Guard Time is the period of time during which, both before and after entering the Esc sequence (+++), the modem is not permitted to receive any characters. Where the Register value is zero, the modem will always go into Command mode after three consecutive Esc signs.

**Range:**  0; 20 to 255 sec; interval 20 ms, Factory setting: 50 (1 sec)


## S14 – General Options

Factory setting:138 (8Ah) (10001010b), Read only register

*Bit 0*      Reserved
*Bit 1*      Command echo (E-command)
0      Echo OFF (E0)
1      Echo ON (E1)(factory setting)
*Bit 2*      Modem messages (Q-command)
0      Modem messages ON (Q0) (factory setting)
1      Modem messages OFF (Q1)
*Bit 3*      Modem messages, verbal/numeric (V-command)
0      Numeric modem messages (V0)
1      Verbal modem messages (V1) (factory setting)
*Bit 4*      Reserved
*Bit 5*      Pulse or Tone dialing (P and T dialing parameters)
0      Tone dialing (T)
1      Pulse dialing (P) (factory setting)
*Bit 6*      Reserved
*Bit 7*      Originate/Answer mode (A-, D-commands)
0      Answer mode
1      Originate mode (factory setting)

## S16 – Modem Test Options

Factory setting: 0; Read only register

*Bit 0*      Local analogue test loop
0            OFF (factory setting)
1            ON (&T1)
*Bit 1*      Reserved
*Bit 2*      Local digital test loop
0            OFF (factory setting)
1            ON
*Bit 3*      Status of remote digital test loop
0            OFF (factory setting)
1            ON (&T6)
*Bit 4*      Status of a remote digital test loop, disengaged by the remote
             modem
0            OFF (factory setting)
1            ON
*Bit 5*      Remote digital test loop with Self-Test
0            OFF (&T5) (factory setting)
1            ON (&T7)
*Bit 6*      Local analogue test loop with Self-Test
0            OFF (factory setting)
1            ON &T8)
*Bit 7*      Reserved


## S18 – Test Timer

This determines the duration of a test loop, disengaged by &T*n*. Where the Register value is zero, test loops must be ended with **&T0** or with the **H**-command.

**Range:**   0-255 sec; factory setting: 0


## S21 – V.24/General Options

Factory setting : 48 (30h) (00110000b); Read only register

*Bit 0,1,2* Reserved
*Bit 3,4*   Condition of Control Line DTR
0            &D0
1            &D1
2            &D2 (factory setting)
3            &D3
*Bit 5*      Condition of Control Line DCD (M5)
0            (&C0)

| 1 | (&C1) (factory setting) |
| --- | --- |
| *Bit 6* | Condition of Control Line DSR (M1) |
| 0 | (&S0) (factory setting) |
| 1 | (&S1) |
| *Bit 7* | Long Space Disconnect |
| 0 | (Y0) (factory setting) |
| 1 | (Y1) |

## S22 – Loudspeaker/Authorized Modem Messages

Factory setting : 118 (66h) (01100110b); Read only register

| *Bit 0,1* | Volume |
| --- | --- |
| 0 | Low (L0) |
| 1 | Low (L1) |
| 2 | Medium (L2) (factory setting) |
| 3 | Loud (L3) |
| *Bit 2,3* | Loudspeaker Condition |
| 0 | Always OFF (M0) |
| 1 | OFF after carrier recognition (M1) (factory setting) |
| 2 | Always ON (M2) |
| 3 | ON during Handshake (M3) |
| *Bit 4-6* | Authorized modem messages |
| 0 | (X0) |
| 4 | (X1) |
| 5 | (X2) |
| 6 | (X3) (factory setting) |
| 7 | (X4) |
| *Bit 7* | Reserved |

## S23 – General Options

Factory setting : - ; Read only register

| *Bit 0* | Authorized a remote digital test loop for remote modem |
| --- | --- |
| 0 | Not authorized (&T5) unchangeable (factory setting) |
| *Bit 1-3* | Interface speed |
| 0 | 0-300 bps |
| 1 | 1200 bps |
| 2 | 2400 bps |
| 3 | 4800 bps |
| 4 | 7200 bps |
| 5 | 9600 bps |
| 6 | 19200 bps |
| 7 | Over 38400 bps |

*Bit 4,5*  Parity
0       Even
1       Reserved
2       Odd
3       No parity
*Bit 6,7*  Guard Tone (country depended)
0       No Guard Tone (&G0) (factory setting)
1       No Guard Tone 550 Hz (&G1)
1       Guard Tone 1800 Hz (&G2)

## S25 – DTR Delay Time

Period of time between the departure of DTR and "hanging up". In synchronous operational mode, the measurement units are seconds, while in other operational modes they are hundredths of seconds.
**Range:**  0-255 sec (1/100 sec); factory setting: 5

## S27 – General Options

Factory setting : 64 (40h) (01000000b); Read only register
*Bit 0–5*  Reserved
*Bit 6*    CCITT/Bell Mode (B) (only at 300 and 1200 bps)
0       CCITT (B0)
1       Bell (B1) (factory setting)
*Bit 7*    Reserved

## S30 – Inactivity Timer

This determines when the modem goes off-line, when no data are being sent or received. If no Error Correction procedure is active, this Register is reset only by transmitted data. With other procedures, the Register is reset by any data which are recognized. The timer works only in asynchronous mode.
**Range:**  0-90 sec; factory setting: 0

## S33 – Sleep Mode Timer

S33 determines when the modem enters sleep or power-down mode. When enabled (S33 ≠0), the controller enters sleep modem whenever the modem has been in-active for a user-programmable time delay (S33). The modem is considered to be in an inactive state when:

1. No internal processing is being performed
2. No activity occurs between the host and the modem within a specified time period
3. The modem is off-line

The modem exits sleep mode whenever the host reads or writes to the modem or when a ring signal is detected Sleep mode is disabled by setting S33 to ‚0‘.

**Range:**   0-255 sec

## S37– Maximum Line Speed Attempted

This S-Register selects the maximum line speed allowable (that is, the modem attempts to connect at this speed or falls back to a lower speed). Settings for Bn, +MS=m, Nn, and S37 determine the allowable modem connections. S37 provides the same information as the +MS=m *<max rate>* parameter. Changing the +MS=m *<max rate>* parameter automatically changes the value of S37. For ex-ample, setting +MS=m *<max rate>* to 0 sets S37 to 0. Note that S37 has no effect during V.32 bis retraining/rate negotiation

| | |
|---|---|
| n = 0 DTE Rate | n = 18 31,200 |
| n = 1 Reserved | n = 19 33,600 |
| n = 2 Reserved | n = 20 36,000 |
| n = 3 300 | n = 21 33,333 |
| n = 4 Reserved | n = 22 37,333 |
| n = 5 1200 | n = 23 41,333 |
| n = 6 2400 | n = 24 42,666 |
| n = 7 4800 | n = 25 44,000 |
| n = 8 7200 | n = 26 45,333 |
| n = 9 9600 | n = 27 46,666 |
| n = 10 12,000 | n = 28 48,000 |
| n = 11 14,400 | n = 29 49,333 |
| n = 12 16,800 | n = 30 50,666 |
| n = 13 19,200 | n = 31 52,000 |
| n = 14 21,600 | n = 32 53,333 |
| n = 15 24,000 | n = 33 54,666 |
| n = 16 26,400 | n = 34 56,000 |
| n = 17 28,800 | n = 35 57,333 |

*Current download speeds are limited to 53,333 bps due to the limited power levels of the PSTN

# Appendix TECHNICAL INFORMATION

## GLOSSARY

| | |
|---|---|
| AAE | Automatic Answering Equipment |
| AM | Amplitude Modulation |
| BPS | Characters per second |
| BSC | Byte Synchronous Communication (synchronous protocol) |
| DCE | Data Communication Equipment |
| DTE | Data Terminal Equipment |
| DPSK | Differential Phase-Shift Keying |
| DTE | Data Terminal Equipment (= DTE) |
| ETX | End of Text |
| FCS | Frame Checking Sequence |
| FM | Frequency Modulation |
| FSK | Frequency Shift Keying |
| HDLC | High Level Data Link Control (Synchronous Protocol) |
| MFV | Multi-Frequency Dialing Procedure (= Tone Dialing) |
| MNP | Microcom Networking Protocol (Process for Error Checking and Data Compression) |
| oK | Upper Channel |
| PM | Phase modulation |
| PSK | Phase Shift Keying |
| QAM | Quadratic Amplitude Modulation |
| Retrain | Synchronisation of Modem where Line Conditions have changed |
| SDLC | Synchronous Data Link Control (synchronous protocol) |
| STX | Start of Text |
| SYN | Synchronous Character |
| uK | Lower Channel |
| Sign | Data Frame, made up of Data bits |
| Length | Start, Stop and Parity bits |

## CCITT RECOMMENDATIONS

V.8      Method for initiating a data transfer with the best modulation possible

V.21     300 bps, full-duplex, synchronous and asynchronous, 2-point Frequency Shift Keying

V.22     1200 bps with Fallback to 600 bps, full-duplex, synchronous and asynchronous 4-point Frequency Shift Keying

V.22bis   2400 bps with Fallback to 1200 bps, full-duplex, synchronous and asynchronous 16-point Quadratic Amplitude Modulation

V.23     1200/1200 bps in 4-wire operation, 1200/75 bps in 2-wire operation, 600/600 bps in 4-wire operation, 75/1200 bps in 2-wire operation, 75/600 bps in 2-wire operation, 75/75 bps in 2-wire operation, synchronous and asynchronous, Frequency Shift Keying

V.24     List of definitions for interface cabling between Data Terminal Equipment (DTE) and Data Communication Equipment (DCE)

V.25     Automatic Call-Answering Equipment and/or Parallel Dialing Equipment in the public telephone dialing system, using 200 Group interface cabling

V.25bis   Automatic Dialing and/or Call-Answering Equipment in the public telephone dialing system, using 100 Group interface cabling

V.26     2400 bps with Fallback to 1200 bps, 4-wire dedicated line, 4-phase differential modulation

V.26bis   2400 bps with Fallback to 1200 bps, dialing line operation, half-duplex, synchronous, 4-phase differential modulation

V.26ter   2400 bps with Fallback to 1200 bps, dialing and 2-wire dedicated line operation with echo elimination, full-duplex, synchronous, differential phase modulation

V.27     4800 bps with Fallback to 2400 bps, 4-wire dedicated line operation, 8-phase differential modulation, synchronous, half/full-duplex

V.27bis   4800 bps with Fallback to 2400 bps, full or half-duplex in 4-wire, dedicated line operation, 8-phase differential modulation at 4800 bps; 4-phase differential modulation at 2400 bps

V.27ter   4800 bps with Fallback to 2400 bps, dialing line operation, half-duplex; with 8-phase differential modulation at 4800 bps and 4-phase differential modulation at 2400 bps.

V.28     Definition of the electrical characteristics of so-called non-symmetrical polar lines

V.29     9600 bps, dedicated line operation; Fallback to 7200 or 4800 bps. 16-point quadratic amplitude modulation

V.32     9600, 4800 and 2400 bps with Fallback to 4800 bps dialing line; synchronous and asynchronous, echo suppression; 16/32-point quadratic amplitude modulation; differential Trellis Coding and/or non-redundant coding, full-duplex

V.32bis  9600, 4800 and 2400 bps with Fallback to 4800 bps

**Appendix-2** *TECHNICAL INFORMATION*

| V.34 | 28800…14400, 9600, 4800 u. 2400 bps, Fallback to 4800 bps; full-duplex and half-duplex |
| --- | --- |
| V.Fast Class | 28800…14400 |
| V.42bis | Error Correction and Data Compression Procedure to CCITT |

**Table A-1**     Technical Specifications

**Parameter Specifications**

| Methods of operation | Asynchronous with manual and automatic dialing (AT-commands) |
| --- | --- |
| Error Correction and Data Compression | MNP Classes 1–5, V.42 and V.42bis |
| Transmission rates and Modulation procedure | See Chapter 1 |
| Tolerance for deviation from nominal speed | Max.: +1 (+ 2,3), -2,5% |
| Character length asynchronous | 7, 8, 9, 10, 11 Bits (incl. Star and Stop bits) |
| Pulse adjustment in synchronous mode | Internal: Local oscillator<br>Extern: Pulse loop (Receive pulse = send pulse) |
| Interface with telephone network | Dialing line: 2-wire, full duplex |
| Digital interface | RS232 |
| Automatic dialing | DTMF dialing |
| Loudspeaker | Software-controlled: 3 volume levels. |
| DTMF amplitude fluctuation | <1 Db |
| Tone duration | 90 ms |
| Guard tone | 550 Hz, 1800 Hz or no Guard tone |
| Temperature range | 0–40° C |
| Storage temperature | -25–+70° C |
| Air humidity | max. 85% (Rel.) |
| Dimensions | 120 *123 * 20 mm (L*B*H) |
| Weight | ca. 50 g |

## Support-Inquiry

Creatix Polymedia GmbH
Heinrich Barth Strasse 3
D-66115 Saarbruecken
+496819811444

| | |
|---|---|
| Name | Given name |
| Telephone | Fax |
| Street | Email |
| PLZ          Ort | |
| Product | Serial-number |

| | | | |
|---|---|---|---|
| Operating system | ❏ DOS | ❏ Windows 95 | ❏ Windows ME |
| | ❏ Windows 3.1 | ❏ Windows 98 | ❏ Windows 2000 |
| | ❏ Windows 3.11 | ❏ Windows NT 4.0 | ❏ others |

Software        ❏ delivered - which?

❏ others:

| | |
|---|---|
| Used settings | COM-Port |
| (see Chapter 1) | IRQ |

Additional Cards        ❏ no
(please give description about IRQ and DMA)

❏ Sound card
❏ Streamer-Controller
❏ Network Card
❏ CD-ROM-Controller
❏ others:

Do you use only the delivered Original cables?
❏    Yes
❏ others: (for example extension lead, Telephone cable end so on.)

**Appendix-4** *TECHNICAL INFORMATION*
## Problems

You get the error message **also**:
❑ with an other Software
❑ with any COM-setting
❑ using the device with an other PC

**DFÜ** general **–** used Initstring:
❑ no Connection
❑ abort of the Connection
❑ smear signs at the screen
❑ many errors with Up-/Downloads (Data transfer), which?
❑ other errors, Description:

---

**FAX -** used Initstring:
❑ send Fax
❑ receive Fax
❑ Faxpolling
❑ Error with a special Fax machine
❑ Error with every Fax machine
❑ other Errors, Description:

---

**Internet** (over PPP or SLIP) **-** used Initstring:
❑ no Connection
❑ abort of the Connection
❑ smear signs at the screen
❑ other Errors, Description:

**Other problems or questions**

## Installation hint for our customers

This device has been designed to be connected only to the public analogue telephone network. Please referee to the technical information in this manual.