MaxNodeld	The parameter MaxNodeId determines the maximum number of devices that are connected to a STAR.		
Location	Authorization Level:	2	
	Preset value:	1	
	Scope:	1 250	
	The parameter <i>Location</i> can be edited freely to determine the location of the IWMAN radio modem, e.g. Water_Tower01 or rooftop .		
	Authorization Level:	2	
	Preset value:	default-location	
	Scope:	No value	

2.5.2 Parameter for the Serial Configuration Interface

The following parameters serve for the communication with the serial configuration interface and are important for the correct communication with the command line level.

ConBaudrate The parameter *ConBaudrate* determines the Baud rate that can be transferred over the RS-232-interface for configuring the WIMAN.

Authorization Level:	1
Preset value:	9600
Scope:	300, 1200, 2400, 4800, 9600, 19200, 38400, 57600

ConDataBit The Parameter *ConDataBit* determines the length of the data bits when transferring data over the RS 232-interface.

Authorization Level:	2
Preset value:	8
Scope:	7,8

ConHandShake The parameter *ConHandShake* determines the handshaking mode during a transfer on RS-232-interface. It can be selected between a software-controlled handshaking and no handshaking. With software-controlled handshaking the control sequences Xon and Xoff are used.

Authorization Level:	2
Preset value:	soft
Scope:	soft, none (no handshaking)

ConPageSize The parameter *ConPageSize* indicates, how many lines in the respective command line window (terminal window over RS-232-interface) are to be represented, before the continuous output of the parameters is stopped. The size of an output page is thus finally determined.

Authorization Level:	2
Preset value:	24
Scope:	10 100

ConPauseMode The parameter *ConPauseMode* determines if the output on the display shall be stopped after the number of lines given with *ConPageSize* or not.

Authorization Level:	2
Preset value:	On
Scope:	On, Off

ConParity The parameter *ConParity* determines the type of the parity check on the serial RS-232-interface.

Authorization Level:	2
Preset value:	none (no parity check)
Scope:	none, odd, even

ConStopBit The parameter *ConStopBit* determines, how many stop bits are supposed to follow the data bits on the serial RS-232-interface.

Authorization Level:	2
Preset value:	1
Scope:	1, 2

2.5.3 Parameter for the serial data Interface

The following parameters serve for the configuration of the serial data interface and are important for correct data exchange between the Router and the WIMAN radio data modem.

SerBaudrate The parameter *SerBaudrate* determines the Baud rate for the data communication on the X21-interface.

Authorization Level:1Preset value:2048000

	Scope:	19200, 48000, 64000, 128000, 256000, 512000, 1024000, 2048000
SerCRC	The parameter <i>SerCRC</i> determines the error correction proce dure that can be used (check total of 16 or 32 bits).	
	Authorization Level:	2
	Preset value:	16
	Scope:	16, 32
SerEncode	The parameter <i>SerEncode</i> determines the coding procedure on the X.21-interface. It can be selected between the values NRZ or NRZI. NRZ is for No Return zero and NRZI for NO Return zero Inverted .	
	Authorization Level:	2
	Preset value:	NRZ
	Scope:	NRZ, NRZI
SerControl	Determines whether the external control signal is analyzed (SerControl normal) on the synchronous serial interface (e.g. C with X.21) or whether the signal is set internally by the WIMAN device (SerControl internal). Latter adjust ment is particularly necessary with the application of 10paired (10x2) data cables (between hybrid cables 2 and 3), since the C line of the DTE is not been transferred here.	
	Authorization Level:	2
	Preset value:	Normal

2.5.4 Network-Parameter

Scope:

IPDefaultGW The parameter *IPDefaultGW* determines, to which IP address IP packages are to be sent, whose target is not situated in the configured local area network and thus is not known in this network

Normal, Intern

Authorization Level:	2
Preset value:	0.0.0.0
Scope:	valid IP-address

IPEthAddress The parameter *IPEthAddress* determines the IP address, which is bound to the Ethernet interface (an IP address from the local area network).

Authorization Level: 2

	Preset value:	0.0.0.0
	Scope:	valid IP-address
IPEthMask	The parameter <i>IPEthMask</i> determines the subnet-mask for the IP network bound to the Ethernet interface.	
	Authorization Level:	2
	Preset:	0.0.0.0
	Scope:	valid IP-subnet-mask
IPSerAddress	The parameter <i>IPSerAddress</i> determines the IP address, which is bound to the X.21-interface (an IP address from the local area network).	
	Authorization Level:	1
	Preset value:	0.0.0.0
	Scope:	valid IP-address
IPSerMask	The parameters <i>IPSerMask</i> determines the subnet-mask for the IP network bound to the X.21-interface.	
	Authorization Level:	1
	Preset value:	0.0.0.0
	Scope:	valid IP-subnet-mask
IPWLAddress	The parameter <i>IPWLAddress</i> determines the IP address, which is bound to the wireless interface (an IP address from the local area network). This parameter is not available on STAR devices.	
	Authorization Level:	1
	Preset value:	0.0.0.0
	Scope:	valid IP-address
IPWLMask	The parameter <i>IPWLMask</i> determines the subnet-mask for the IP network bound to the wireless interface. This parameter is not available on STAR devices.	
	Authorization Level:	1
	Preset value:	0.0.0.0
	Scope:	valid IP-subnet-mask
IPTFTPServer	The parameter <i>IPTFTPServer</i> indicates the IP address of a Server, from which a software download can be executed.	
	Authorization Level:	2
	Preset value:	0.0.0.0

Scope:

valid IP-address

2.5.5 Other Parameter

PS1 The parameter *PS1* determines the appearance of the WIMAN command line prompt. The factory-installed setting is WIMAN II >. However, the user has the option to edit the command line prompt (e.g. DEVICE 1:).

Authorization Level: 2

SyncMode The parameter *SyncMode* determines whether the WIMAN generates the Burst-synchronizing signal (master), or if it will receive an externally generated Burst signal (Slave). Further details to this parameter can be found in chapter 4.5 on page 53

Authorization Level:	2
Preset value:	Off
Scope:	Off, Master, Slave

2.6 Instructions

Issuing instructions on the command line level configure the WIMAN radio modem. The instructions available for use depend on the authorization level and the operating mode.

The instructions can be roughly divided into three categories:

- Instructions for the manipulation of passwords and authorization levels
- Instructions for manipulating and transferring configuration data
- General instructions

2.6.1 <u>Instructions for the manipulation of Passwords and</u> <u>Authorization Levels</u>

The following commands are available for the designation and modification of passwords:



Note

To execute instructions the device must be in configuration mode (see Chapter 3, page 33)

Passwd console

The instruction *Passwd console* permits the definition of a password for access to the first authorization level (console).

When selecting a password, be sure to use the designated characters only (see page 14). For instructions on how to set up a password for authorization level one, see Chapter 3.5.1, page 40.

- **Del Passwd console** The instruction *del Passwd console* deletes the password for authorization level one (console). For mor information see Chapter 3.5.2, page 41.
- **Passwd enable** The instruction *passwd enable* permits the designation of a password for access to authorization level two (Enable). When entering the password, be sure tu use the specified characters only (see page 14). For instructions on how to set up a password for authorization level two, please refer to Chapter 3.5.3, page 40.
 - **Enable** The instruction *Enable* enables you to switch from the instruction mode of the authorization level one into the command mode of the authorization level two (see page 25). To enter the authorization level two a password is always required.

2.6.2 Instructions for manipulating and transferring of Configuration Data

- **checkcfg** The instruction *Checkcfg* checks if all the parameters are valid and entered correctly. This instruction can only be issued in configuration mode.
 - **Config** The instruction *Config* enables to change from the command mode of the respective authorization level into the configuration mode (see page 25). A successful transition into the configuration mode is displayed by the term (*config*) behind the command-line prompt and before the indication of the authorization levels (located in parentheses). The following example shows the factory-installed command-line prompt for authorization level two:

WIMAN II (config) #

- **Del Config** The command *Del Config* enables the factory-installed preset parameter-values to be transferred from the non-volatile configuration to the new configuration. All modifications entered before will be overwritten. This command can be given in configuration mode only.
- **Del <paraname>** The command *Del < paraname >* enables a transferring of the factory-installed preset parameter-value for the parameter defined in < *parname >* from the non-volatile configuration into the new configuration. All modifications of < *parname >* are overwritten with defined parameters. In contrast to the instruction *Del Config*, it is possible to overwrite directed parameters with the factory-installed defaults. This instruction can be issued in the configuration mode only.

Exit The command *exit* enables you to leave the configuration mode or the command mode.

When leaving the **config mode** after having changed at least one parameter, you will be asked whether these modifications should be made the present configuration.

You now have the choice to:

- Make the modifications the present configuration and leave the config mode by entering 'y',
- Discard the modifications to the present configuration and leave the config-mode by entering 'n', or,
- stay in configuration mode and make the modifications only the new configuration by entering 'c'.

When leaving the **command mode** after having changed at least one parameter (at least one parameter was modified in the configuration mode and the modification was made the present configuration), You will also be asked if these modifications are to be considered with the next restart (They will be transferred into the non-volatile configuration).

You now have the choice to:

- transfer the modifications to the non-volatile configuration and leave the command mode by entering 'y',
- discard all modifications made and leave the command mode by entering 'n' or
- stay in the command mode and keep the modification of the parameters exclusively as present configuration by entering 'c'.



Note

Entering the command *exit* at the command line level (Shell) will always allow you to leave the command mode. This procedure ensures that modifications made in a higher authorization level are saved.

Export The command *Export* makes it possible to export the configuration parameter values into an ACSII-file. The Serial number of the WIMAN as well as the encrypted passwords are put out, too. The range of the parameter values depends on the authorization level in which you are when issuing this command. At the end of the configuration file, the passwords for the individual authorization levels are exported in encoded form, excluding the passwords for the authorization levels you have no access to. Figure 6 shows a possible configuration file.

> ## WIMAN II configuration file, Version 1.0 (serial number -2122317799) # Air Destination 1 LoopTest False MaxClient NetId 255 NodeId Ω # Serial ConBaudrate 9600 ConPageSize 20 wimanii PS1 passwd console crypt Avh8scXklqnk66A

> > Figure 6

exported configuration file

cvalue> The instruction *context of the structure of*

Save The instruction *save* transfers the present configuration into the non-volatile configuration. This instruction can be issued only in the command mode.

Restore The instruction *Restore* enables a transferring of the parametervalues from the non-volatile configuration into the new configuration. All modifications completed before are overwritten. This instruction can be issued in the configuration mode only.



Attention:

Since the parameter-values of the non-volatile configuration do not have to correspond with the values of the present configuration, an operational disturbance can occur. This can happen due to a false configuration when leaving the configuration mode with simultaneous transfer of the data into the present configuration (the query when leaving the config mode was acknowledged with y).

Before storing of the data into the present configuration, be sure that the parameters are occupied with the values necessary for your configuration.

2.6.3 General instructions

Help The instruction *Help* displays a summarized list of instructions. The output on the command line level appears as follows:

WIMAN_Star # help WIMAN II Wireless Data Communication Equipment (c) 1999-2000 ALTVATER AIRDATA Systems GmbH & Co. KG, Bad Rappenau Germany Built-In shell commands: config - enter config mode clear - clears a VT 100 screen clear stat <type> - clears the statistic <type> exit - exit configuration shell export - export configuration - display these few helpful help lines help reset - reset unit save - save running config to boot config show- display running config and differences to boot configshow <regex>- display parameter(s) matching <regex>stat <type>- display statistic information of <type>swupdate <swlst>- get software update list <swlst> from TFTP Server

How to use command line editing, the shell history function and the syntax of a valid <regexp>, please see the user's manual.

Figure 7 Help display output

<parname></parname>	The input of a valid parameter name alone leads to textual in-
•	formation available for this parameter. The admissible scope for
	this parameter is displayed and the factory-installed preset value
	are displayed, too.

- **clear** The command CLEAR deletes the display on the command line level of the respective terminal program (e.g. Telix or telnet window).
- **reset** The instruction *reset* restarts the WIMAN (Hardware reset).

2.6.4 Statistics Instructions

The WIMAN radio modem collects statistics data and system information on both software and hardware as. In case of an error, a very exact search for the cause of the error is possible with the help of the statistics explained below.

Stat The command *Stat* displays a list of the available statistics. The display output appears as follows:

WIMAN_Star	#	stat
The followi	ing	g statistics are available:
serial	-	serial interface statistics
eth	-	ethernet interface statistics
fr	-	common frame relay information
fr <dlci></dlci>	-	traffic on frame relay <dlci></dlci>
frmap	-	show dlci switching map
wl	-	common wireless interface information
wl <n></n>	-	traffic on wireless interface node <n></n>
qos <n></n>	-	actual quality of services wireless interface <n></n>
ipif	-	IP interfaces
iproute	-	IP routing table
tp	-	transparent interface statistics
sync	-	RF and external synchronisation
hw	-	hardware statistics
sw	-	software statistics
update	-	software update statistics
sysmsg	-	system messages
syserr	-	system errors
date	-	actual date and time

Figure 8 the statistics assistance display

Stat <type>

The instruction *Stat <type>* displays the statistics specified with *<type>*. The following statistics can be selected:

• serial

supplies statistics of all serial interfaces

• fr

supplies general Frame Relay information

• fr<dlci>

supplies information of a certain Frame Relay channel (DLCI)

• wl

supplies general information of the wireless interface

• wl<node>

supplies information about the data communication to a certain WIMAN ACCESS selected with *NodeId*

• qos<n>

Quality of service. Supplies performance information about the grade of transmission

- sync supplies information about the synchronization status of the WIMAN.
- sysmsg

supplies a list with system messages

• syserr

supplies the system error list

• hw

•

supplies a list with hardware statistics

SW

supplies a list of software statistics

• tp

supplies traffic information for the wireless hardware driver

• lbt

listen before talking

• con

supplies login-information about the wireless connection

• eth

supplies information about the ethernet connection

• date

supplies information about the time and date

• update

supplies information about the status of a TFTP-update

The parameters *serial*, *fr*, *wl* and *qos* can supply extended information by adding the switch *<ext>* to the instruction, e.g. *stat wl1 ext.*

By adding the switch $cont = \langle x \rangle$ you can achieve continuous output. The $\langle x \rangle$ gives the amount in seconds how fast the update-interval of the output shall be. This function is especially useful when performing a looptest, e.g. *stat qos1 cont=2* displays information about the Quality of Service on the wireless interface 1 in continuous mode. The display is updated every 2 seconds.

Clear stat <type> The instruction *Clear stat <type>* sets the counter statisticsdisplay of the device specified with *<type>* back to zero. The setting of *<type>* to *ALL* clears all statistics.

3 <u>Configuration of the WIMAN radio mo-</u> dem

To adjust the WIMAN to your specific network needs it is necessary to modify some of the factory-installed preset parameters. This modification of the WIMAN can be executed via three different types of interfaces:

- the wireless interface
- the RS-232-interface
- the X.21-interface.

Access to the command line level via the serial RS-232-interface can take place with the help of a terminal program without previous configuration of the WIMAN. The access to the command line level via the wireless interface and the X.21-interface requires a previous configuration of the WIMAN.

3.1 <u>Access to the Command Line Level over the</u> <u>Wireless Interface</u>

To access the command line level over the wireless interface you have to use a TELNET-Program like NETTERM or the like. Just enter the correct IP-address of the WIMAN you want to administer and connect. You will receive the same display as if connecting via a serial cable.

The big advantage is that you can connect to any WIMAN, no matter where it is situated, and that you have the same functionality as when connecting directly via cable.



Checklist:

To access the WIMAN radio modem via the wireless-interface you need:

- A Terminal program (Telix, Hyperterm, etc.),
- A PC/Laptop with an online connection
- A properly configured WIMAN unit

3.2 <u>Access to the Command Line Level over the RS-</u> 232 Interface



Checklist:

To access the WIMAN via the serial RS-232-interface you need:

- Terminal program (e.g. ZOC, TELIX),
- PC/Laptop with a free serial interface (e.g., Com1, Com2)
- Hybrid cable (see chapter 8.3 on page 75)
- RS-232-connection cable with proper 9- or 25-pin plug/ socket, which fit to the plug/socket of the serial interface of the PC/Laptop as well as to the RS-232-interface of the hybrid cable.
- Power supply for the WIMAN (supplied with the WIMAN hardware)

Follow these steps to access the command line level of the WIMAN:

- 1. Connect the hybrid cable with the 37pin D-Sub connector at the backside of the WIMAN.
- 2. Connect one side of the RS-232 cable with the serial interface of the PC and the other side with the RS-232 link of the hybrid cable.
- 3. Connect the DIN plug of the power supply with the hybrid cable and the plug of the power supply with an AC socket.

The illuminated power LED on the front of the WIMAN will indicate that the WIMAN is activated.

Figure 9 shows the arrangement of equipment for the configuration of the WIMAN radio modem.



Computer with VT1xx-emulation

WIMAN-unit

Figure 9

arrangement of equipment for the configuration of the WIMAN radio modem

4. Start the PC and afterwards the terminal program.

The operating system of the WIMAN has an integrated command line interpreter ("Shell") for configuration. Input and output is shown on the input/output window of the PC terminal program (e.g. TELIX, ZOC), which must be able to emulate a VTterminal (DEC). The communication parameters of the terminal program and the WIMAN must correspond so that the WIMAN and the Computer can communicate.



Note:

The default settings of the RS-232-interface of the WIMAN is adjusted to a data rate of 9600 Bit/s, a data length of 8 data bits, one stop bit and no parity check (8N1). As handshaking procedure software handshaking is configured.

To ensure that the terminal program uses the same parameters, set the communication parameters of the terminal program to the values stated above. If these parameters were not set correctly communication with the WIMAN radio modem is not possible.

These values can be preset in the terminal program, thus starting the terminal program immediately with the suitable settings.

After the WIMAN is attached to the operating voltage, it switches itself into the transparent data-communication operating mode. Pressing the INPUT key in your terminal program brings you to the command line level of the WIMAN.

The command line prompt should appear as follows:

WIMAN II Configuration Shell (TTY connection)

WIMAN-II >

If the WIMAN is not configured to the factory-installed defaults, another command line prompt may appear. It is also possible that the first authorization level of the command line level is protected by a password.

If so, the following message appears:

WIMAN II Configuration Shell (TTY connection)

Enter password:

In this case you need the password of the supplier of the WIMAN. If the password should not be available, please contact your WIMAN Distributor.



Note:

If you do not arrive at the command line level of the WIMAN or if only "confused" characters are shown on the screen after you have adjusted the above mentioned settings, do not be concerned. It may be that the configuration of the WIMAN has already been modified. In this case test different adjustments regarding the Baud-rate, the Stop-bits, etc.

3.3 <u>Access to the command line prompt via the</u> <u>X.21-interface</u>

Will be created later

3.4 <u>Setting of the Parameters of the Differnt Inter-</u> <u>faces</u>

3.4.1 <u>Setting of the Parameters for the Wireless Interface</u>

The settings of the parameters for the wireless interface can be divided into the following two categories:

- base parameter and
- extended parameters.

The base parameters *destination* (see page 17), *LoopTest* (see page 19), *NetId* (see to page 19) and *NodeId* (see page 19) can be modified already in authorization level one (e.g. by the final customer).

The extended parameters (all remaining parameters in section 2, on page 39) can only be modified in authorization level two.

To set the base parameters for the wireless interface:



Checklist:

You need the values of the parameters *destination* (*only LINE*), *NetId* and *NodeId*. To obtain these values please check with your Provider.

1. Access the command line level of the authorization level one (see chapter 2) and change into the configuration mode by entering the *config* -command. You will receive a similar display output (depending on the prompt configured) like:

```
WIMAN-II (config) >
```

2. Type in the command *show*.

You will receive a list of the changeable parameters in authorization level one e.g. in the following display output:

WIMAN_Star (config) > show Config mode	running config (new config)
# Wireless NetId NodeId	250 0	
# Serial SerBaudrate	2048000	
# Console ConBaudrate	9600	
# Network IPSerAddress IPSerMask	192.168.40.2 255.255.255.224	

All changeable parameters for the wireless interface are listed under the category "#Wireless".

3. Modify the parameters according to the specifications of your Provider. Type in the parameter, followed by a blank, next add the value of the parameter and press **ENTER**.

```
NetID 255 니
NodeId 2 니
```

4. Check with *checkcfg* whether all values for the parameters were input correctly. If the inputs were correct, you will receive the following display output:

```
WIMAN-II (config) > checkcfg
parameter check successful
```

In case of an incorrect input you receive an error message with output of the accepted parameter e.g.:

```
wimanii (config) > checkcfg
bad value: NodeId
configuration invalid
```

5. Type in the instruction *show* again to compare the input values with the values given by your Provider. The new configuration of the parameter is displayed in parentheses.

Access_01 (config) Config mode	<pre>> show running config</pre>	(new config)
# Wireless NetId NodeId	250 (1 (255)

3 Configuration of the WIMAN radio modem

6. In order to transfer the modifications into the current configuration leave the configuration mode with *exit* (see page 27).

The following display output appears::

Configuration changed, do you want to save (y)es / (n)o / (c)ancel ?

You now have the choice to do one of the following:

- Transfer the new configuration to the current configuration and to leave the configuration mode by pressing the key " y,
- Leave the configuration mode without transferring the new configuration to the current configuration by pressing the key " n "
- Remain in the configuration mode and repeat the configuration or do another modification of parameters (if necessary) by pressing the key " c ".

In order to maintain the values after a restart it is necessary to store them in the non-volatile configuration. This can be done in two ways:

• With input of the command *save* (see page 28) in the command mode.

All modifications made at this configuration are stored in the non-volatile configuration and are available after a restart.

The command-mode will not be left.

• With input of the command *exit* (see page 17) in the command mode.

When leaving the command mode the WIMAN radio modem checks whether the present configuration modifications are available for non-volatile configuration. Since you made some modifications the following display output appears:

Boot config differs from running config, save (y)es / (n)o / (c)ancel ?

You now have the choice to do one of the following:

- Transfer the modifications to the non volatile configuration and to leave the command mode by pressing the key "y",
- Discard the modifications and leave the command mode by pressing the key "n" or
- Don't take over the modifications but stay in command mode and redo some modifications by pressing the key "c"

To set up the extended parameters for the wireless interface:



Attention:

In order to avoid disturbances in the current line operation, only qualified personnel in arrangment with the Provider may carry out these modifications.



Checklist:

You need a list of the parameters configured by your Provider.

- 1. Access the command line level of the authorization level two (see chapter 2 on page 13) and change into the configuration mode with the command *config*.
- 2. Proceed as shown under point 2. during *adjustment of the base parameters* and replace thereby the term " authorization level one " with " authorization level two ".

3.4.2 Setup of the Parameter of the serial interfaces

The adjustments of the parameters for the serial interfaces can basically be divided into the following two categories:

- Basic parameter and
- extended parameter.

The only base parameter that can already be modified in authorization level one (e.g. of the final customer) is *ConBaudrate* (see page 21).

All other parameters (see chapter 2 starting from page 13) may exclusively be modified in authorization level two.

To set the parameters of the serial interfaces:

Proceed as shown in Chapter 3.4.1 on page 36

3.4.3 <u>Setup of the network parameter</u>

The setting of the network parameters can exclusively be executed in the authorization level two. You will find the definitions of the individual parameters in chapter 2 starting on page 23.

3 Configuration of the WIMAN radio modem



To setup the network parameter:

Attention:

In order to avoid disturbances of the current line operation, only qualified personnel in arrangement with the Provider may execute these adjustments.

|--|

Checklist:

You need a list of the parameters that can be configured of your Provider.

Proceed as shown in Chapter 3.4.1 on page 36

3.4.4 <u>Setup of the other parameters</u>

The only other parameters are PS1 and SyncMode (see page 25).



Note:

In order to avoid disturbances of the current line operation, only qualified personnel in arrangement with the Provider may execute these adjustments.

Proceed as shown in Chapter 3.4.1 on page 36

3.5 Modification of the WIMAN Passwords

This section deals with the configuration of the passwords of the WIMAN radio modem. Before you alter the factory-installed preset passwords make sure to jot down the new passwords and store them in a safe place.

3.5.1 <u>Setting of a Password for the Authorization Level</u> one (console)

To change/set a password for the authorization level one:

1. Access the command line level one. If the command line prompt appears (for example: WIMAN II >), proceed to No.2.

If you are asked for a password, e.g.: Enter password: ****

> Type in the correct password and press the ENTERkey. Now the command line prompt should appear, for example:

WIMAN-II > _