

Datafox BDE-MasterIV



Flexible data collection with method

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1 Introduction

1.1 Updates in this document

1.2 Alterations of the version

With the device generation IV a new versioning scheme has been introduced. According to this scheme the file name of the device firmware and the setup program (DatafoxStudioIV) is composed as follows:

product name	XX. device- generation	YY. compatibility (which versions can be used together)	ZZ. version number (functional ex- tension)	Build Build trou- bleshooting (with a new ver- sion the Build number is reset)
e. g. BDE-MasterIV	04.	01.	01.	12

The use of the manual depends on the version of the firmware and the DatafoxStudioIV or the DFComDLL. Gather from the following table which manual matches which version. For different combinations no support can be offered.

date	version			
	manual	firmware	Studio/DLL	description
19. April 2006	4.01.01	4.01.01	4.01.01	new release
08. Januar 2007	4.01.01	4.01.01	4.01.03	new release
06. Februar 2007	4.01.01	4.01.01	4.01.03	Anschluss eines Meldesignals on page 3.14
06. Juni 2007	4.01.04.16	4.01.04.16	4.01.04.16	new release

1.3 The device file archive (*.dfz)

1.3.1 Description

Device files (*.hex) of the MasterIV - devices are delivered in a common device file archive. It has the file extension dfz (stands for Datafox Zip). Now simply the device file archives are indicated instead of the device files (*.hex). This applies to the DatafoxStudioIV and DLL. The indication of device files (*.hex) is still possible.

1.3.2 Function of the archive

The transmission routine of the device file picks out the fitting file from the device file archive on the basis of the hardware options available in the device. Thus, it is guaranteed that all hardware components available in the device are supported by the corresponding firmware.

1.3.3 Manual selection of a file

If you do not want to integrate the archive in your installation, you have the possibility to add single device files from the archive to the installation.

The file format of the device file archive is Zip. Hence, you can open the archive with every standard Zip-program. Via the menu item "open with..." in the context menu you can chose an appropriate program for opening the file. If necessary you can call up a program combined with this file format to open the file by renaming the file from dfz to zip.

In the archive you find a file called Inhalt.pdf; you can gather from there which file (*.hex) of the archive matches your device. Extract the device file (*.hex) you want and rename it if necessary. A renaming of a file is always possible, because all information are in the file itself.

You can state the device file extracted before as device file in DatafoxStudioIV and at calling the DLL function. It is still tested if the file can be loaded into the chosen device before the transmission takes place.

1.4 Typography of the manual

exposition

contextual meaning

< *BDE-MasterIV*, *SoftwareVersion.pdf* >

file names

< *Setup => edit* >

a path via a program menu at DatafoxStudioIV

communication

a single menu item

FW

abbreviation for firmware (software in the device)

(from FW V 3.1.5)

shows that this function is supported from the firmware version 3.1.5 onwards

SW

abbreviation for software

HW

abbreviation for hardware

(from HW V 2.0)

shows that this option is available from the hardware version 2.0 onwards

GV

abbreviation for global variable

ZK-list

abbreviation for access control lists, where the configuration data for the access control is provided

cross-reference [1.4](#)

In the electronic document you can use the cross-references to jump within the manual. Therefore, cross-references are depicted in blue and crossing them the cursor takes the shape of a hand .



Note:

You will get useful advice which helps you to avoid possible mistakes during the installation, configuration and commissioning.



Caution:

There will be advice given you definitely have to keep to. Otherwise it will lead to defective function of the system.

1.5 Important general advice



Caution:

Use the devices only according to regulations and following the assembly, commissioning and operating instructions. Assembly and commissioning may only be carried out by authorized and qualified personnel.

Subject to technical alterations.



Caution:

Because of technical development illustrations, functional steps, technical processes and data can differ slightly.

Datafox PZE-MasterIV has been developed to create a flexible terminal for time and attendance, order time collection and access control that can easily be integrated. The device is robust and easy to use. You save time through the PC - setup program, because the device is quickly and easily configured for its application field.

The communication-DLL makes possible an easy integration into every application. Diverse options such as bar code reader, transponder reader, digital inputs etc. enables you to use the device for:

- ▶ PZE - time and attendance
- ▶ AZE - order time collection
- ▶ BDE - production data collection (IO-processing)
- ▶ ZK - access control

This manual describes the creation of work flows for time and attendance with the setup program.

Before deciding for the programming in C you should check if the functions of the setup program do fulfil the system requirements after all , because then the development effort will be reduced to a minimum. With some exercise it will be possible to compile a complete entry within half an hour. If you need functions that are not available we should get into contact.

If you need support at the compilation of setups we offer you our services. Because of our wide experience in dealing with the setup we are very quick and can make your setup even more efficient through useful advice, so that the entry at the device can take place quickly and reliably.

Through our experience and with our specialized knowledge of method, hard- and software we produce devices and find solutions concerning data collection, that prove themselves with functionality and practicality. We offer solutions for REFA/ job analysis, time and attendance, production data collection, machine data collection, process data collection and mobile data collection. Our team develops and produces standardized and inexpensive systems. We create solutions using the modular principle and expand them as required. Our service includes consultation, system definition and implementation as well as workshops and training to support you in the introduction.

Guarantee restriction

All data in this manual has been checked carefully. Nevertheless, errors cannot be excluded. Therefore, there cannot be given guarantee nor taken legal responsibility for consequences that derive from errors of this manual. Of course we are grateful if you point out errors to us. Subject to change because of technical improvements. Our general terms and conditions of business apply.



Note:

Because of the DatafoxStudioIV the Datafox devices have many functions and combination of functions; therefore, it is not possible to test all functions and their combinations in case of updates. This applies especially to all the setups you created as a customer. Before updating your device please test if your individual setup works without errors. If you detect an error contact us immediately. We will rectify the mistake at short notice.

2 System structure and functional principle

2.1 Software versions and compatibility of device firmware and setup

The firmware (operating system) of the device and the setup program (*.aes data file = application program) form a unit. With the setup program the configuration for the device (definition of the data tables and the data fields, operation, etc.) is compiled and transmitted to the device. Then the firmware works in accordance with the setup adjustments.

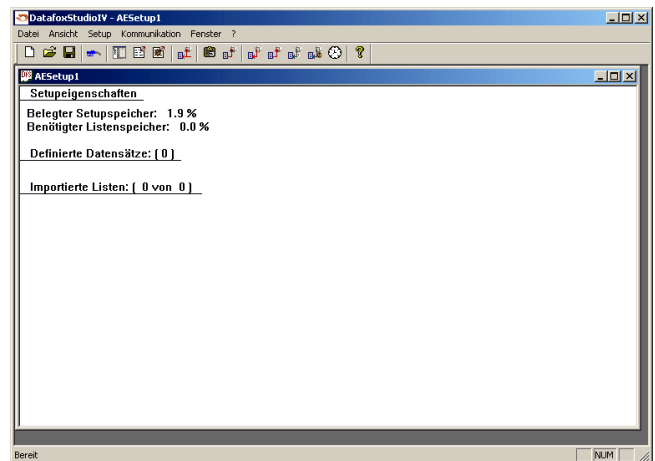
Firmware in device



After switching-on the current firmware version is shown on the display. The firmware can be transmitted to the device with DatafoxStudioIV.

At delivery a demo setup is at the device. The description of the demo setup you will find in chapter 5.3.1. It is advisable to go through the example at first comparing the process with the setup. That way a quick introduction to the configuration is possible.

Setup program on PC



After starting the setup program the user interface is displayed.

You can get information about the current software version via the info dialog of DatafoxStudioIV. Click on the < ? > in the menu bar and then on < info over DatafoxStudioIV >..



Compatibility of firmware and DatafoxStudioIV

The DatafoxStudioIV is downward compatible within the firmware versions 4.x.xx. The second number shows the compatibility group. If this number is changed, a more up-to-date firmware generation must be used.



Note:

Devices with an older firmware can also be configured with DatafoxStudioIV, but only that functions are provided by the device which are also provided by the older firmware. However, it is impossible to configure a more up-to-date firmware version with an older DatafoxStudioIV-Version.

That means, the manual version that corresponds to the firmware with the appropriate setup is always relevant for the possible functions. The manual version and the appropriate DatafoxStudioIV always have the same index. It is impossible to configure a firmware with a DatafoxStudioIV version that is older than the firmware. Recommendation: If possible use the appropriate DatafoxStudioIV version. This version always has to be \geq the version of the firmware.

The data file:

< *BDE – MasterIV, SoftwareVersionen Stand xxx.pdf* > shows which functions are provided by which software release. You will find the file on the CD. Please also comply with the instructions given in the chapters of the manual.

The updates are available for download on our internet page www.datafox.de.



Caution:

When the new device is delivered always the firmware version recently released is used. If you wish to work with an older version please carry out a downgrade. Please comply with the instructions in chapter 2.2.2.

2.2 Firmware



Caution:

A firmware update or downgrade is a very sensitive process. Possibly a reset of the main communication to RS232 may occur. In any case comply with the details about the compatibility in the software version list.

2.2.1 Firmware update



Caution:

Before starting a firmware update please check on the basis of the software version list whether there are any version dependencies that must be kept.

For example, when changing from version 04.00.xx to version 04.01.xx there must be a version 04.00.23.769 or higher as minimum requirement to carry out the update to version 04.01.xx successfully.

2.2.2 Firmware downgrade



Caution:

When carrying out a firmware downgrade the firmware always has to be transmitted to the device twice. This has technical reasons. Errors on the display of the device after the first transmission can be ignored.

2.3 System structure

2.3.1 Device functions

In principle, Datafox BDE-MasterIV offers two possibilities to create workflows for data collection.

- ▶ Via the PC-setup program "DatafoxStudioIV" many processes for data collection can be created quickly without programming knowledge. Such a process is a setup for the device and can be loaded on the device via the communication program. Devices using such setup programs are equipped with the standard firmware at production. (Details about the software versions see chapter 2.1)
- ▶ Free Programming in C. The progression packet offers many basis routines and a supporting program which can be used as basis for own programs. Devices for c-programming are delivered without the standard firmware and only in connection with an instruction.

2.3.2 Communication

There are 4 possibilities available for communication/ data transmission.

1.) Setup- and communication program

The setup- and communication program supports both the setting of the device settings and the important possibilities of data transmission (these data transmission functions are for test purposes primarily). Of course they can also be used for regular data transmission. But this is disadvantageous, because 2 work steps are necessary: At first you have to read out the data via the setup- and communication program and to file them as ASCII-file. Then the second program has to be opened and the file must be imported.

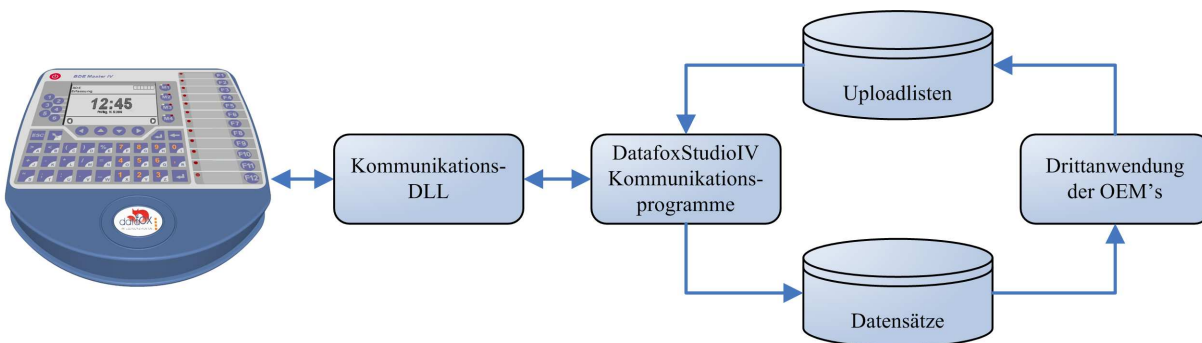


Figure 1: Setup- and Communication programm

2.) **Communication DLL**

The direct way for communicating with the ... is the communication DLL. It can be started with any Windows application. The whole process can be realized without any intermediate files and also be set individually. We advise software producers to choose this method for the integration of the devices. You can find the DLL and the appropriate explanation on the installing-CD.

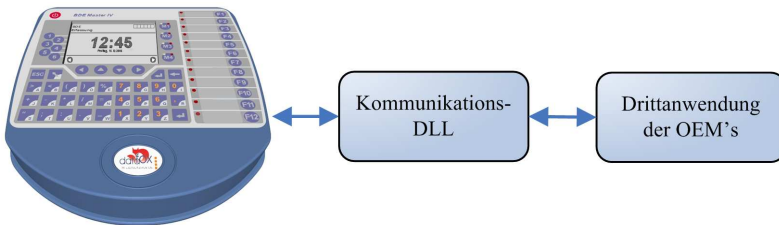


Figure 2: Communication-DLL

3.) **Direct integration via C-Source code**

There are some operating systems that do not support the use of DLLs. In order to solve this problem there is also a C-Source code available on the installing-CD. That way communicating with programs designed under Unix or Linux is also possible.

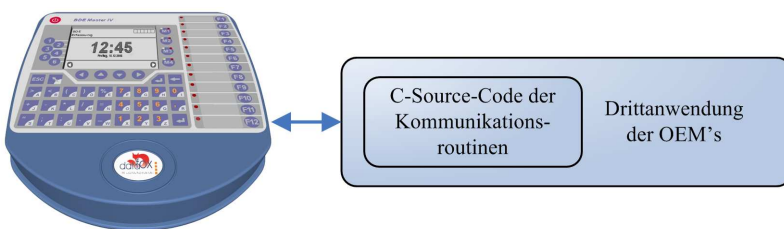


Figure 3: Implementation via C-Sourcecode

4.) **Datafox-Talk**

Via Datafox-Talk data transmission with Datafox AEIII+, Timeboy and the MasterIV-series is possible on file- and database layer. Therefore it is an alternative to communication via DLL. An advantage of this method is, that no installation is necessary. The data are taken over and displayed as ASCII-file. If desired and with computation a direct connection to databases is possible. There the customer has to decide which database tables and fields shall be filled. Datafox-Talk supports all functions for transmitting data and for setting the device. Via timing the times for transmission can be set freely. Via additional modules the data can also be transmitted per radio, internet, telephone-/ mobile network.

Advantages:

- ▶ Via Datafox-Talk integration of the devices can be realized easily and fast.

- ▶ Transmission takes place automatically and is ensured via a log file.
- ▶ The data are accessible forthwith.
- ▶ There is no programming work for data transmission.

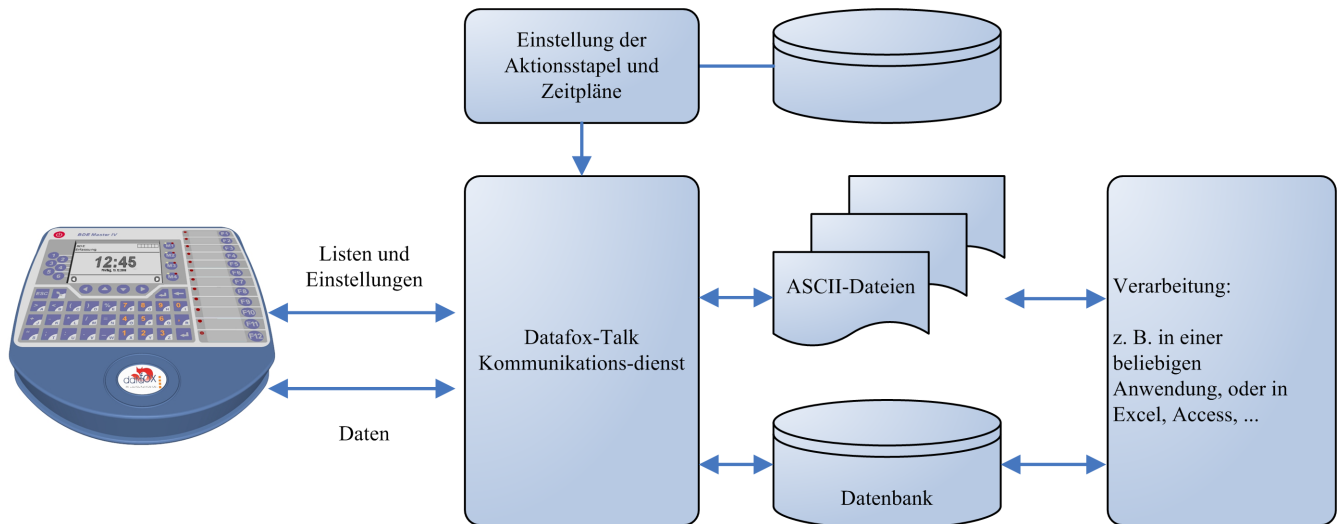


Figure 4: Datafox-Talk

Supports the following types of transmission:

- ▶ RS232
- ▶ RS485
- ▶ TCP/IP
- ▶ WLAN
- ▶ Funk 433 MHz
- ▶ Modem (GSM/GPRS)
- ▶ Cellular radio, mobile phone with integrated modem

The following actions are possible:

- ▶ Transmitting setup to the devices
- ▶ Setting a clock
- ▶ Transmitting lists to the devices
- ▶ Reading out of data
- ▶ Writing log files and error lists where necessary
- ▶ Filing of data as ASCII-file, Excel-file, Dbase-File or ACCESS-database

The actions are applied as batch and carried out according to the settings of the timing. Timing allows the permanent collection of data (polling) and the collection at any time. The setting via time model is very easy. The working through the actions is logged and therefore always traceable. The same applies to the transmission of lists. Lists are used e.g. to back-up applications, accounts, occupations etc. or to transmit balances.

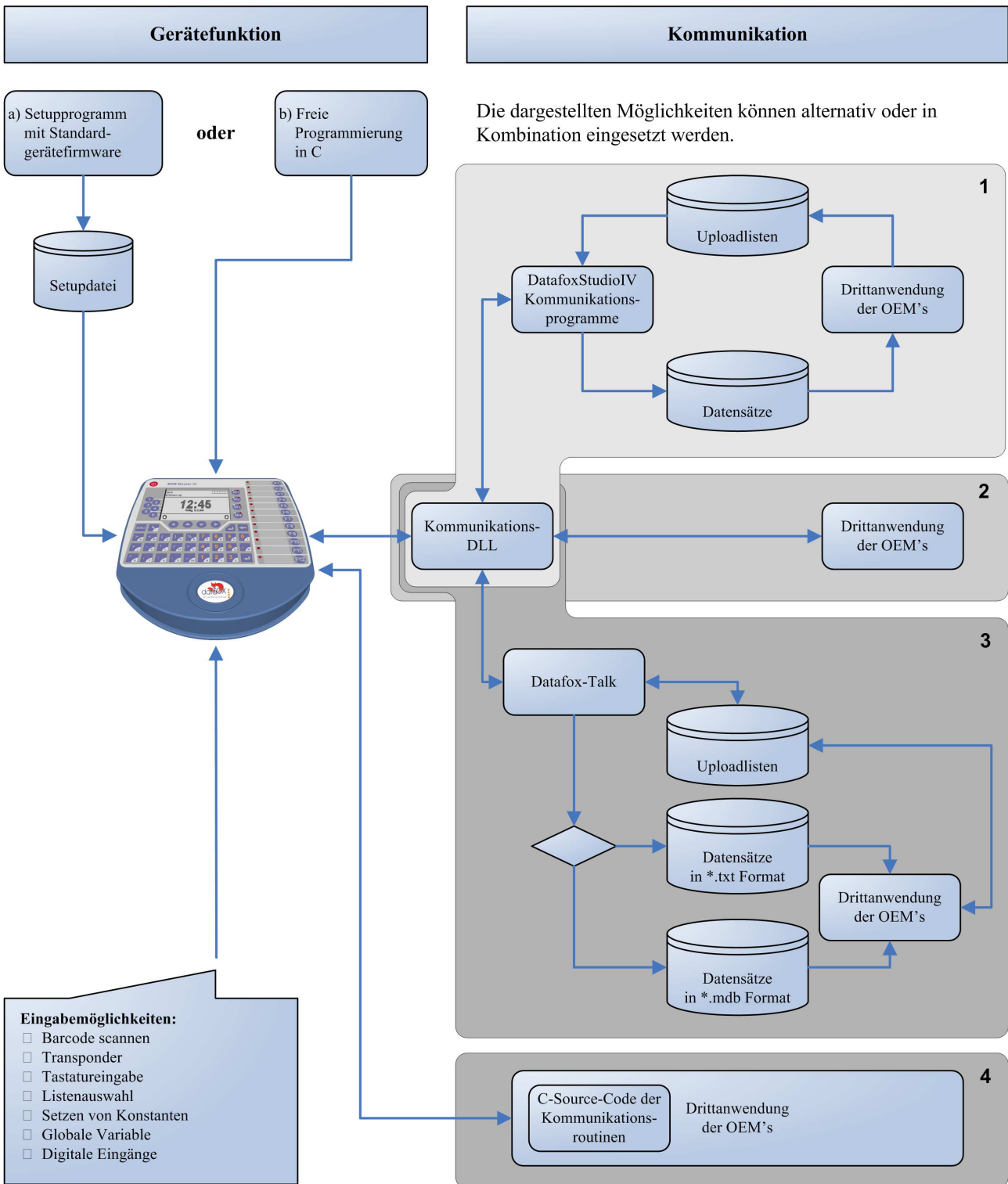


Figure 5: System structure

3 BDE-MasterIV

The BDE-MasterIV can generally also be used outdoors. But then you have to comply with the temperature range of -20 to + 70°C from the data sheet. If the device is installed outdoors, suitable measures have to be taken to protect the plug of the device against humidity. Therefore, IP64 can only be granted if the device is mounted and its backside is completely covered and damp proofed.

It has to be taken care of a suitable protection from direct sunlight because the synthetic materials are not 100% UV resistant. Fading simply is an optical defect which does not restrict the function of the device.



Caution:

Pleas keep in mind that MasterIV terminals use a flash memory. According to the manufacturer each memory sector (512 byte) can be written to a maximum of 100,000 times. The firmware of the terminals distributes the access to the memory sectors, this technique is called wear levelling. Bad blocks in case of write or read failures are not used anymore. However, despite this technique it is not advisable to write the memory too frequently. The application should initialize a new list transfer only after a change of the list data but not cyclically.

Keep in mind the message - FlashService - in the display of the device. It means that the live time of the flash memory according to the manufacturer instruction will be reached soon. Then the device has to be sent to Datafox for service.

3.1 Technical data

CPU	Controller	8 bit, 16 MHz
	Clock	real time clock
Program memory	Flash	128 Kbyte
Data memory	Flash	2 MB standard
	Memory extension	Multi-Media-Card(MMC) up to 1 GB Flash
Display	LCD	graphic 1/4 VGA 320 x 240 Pixel, 122 x 92 mm
	Backlight	LED-Backlight
Keyboard	Typ	tactile feedback with full switch way
	Size	diameter 14 mm
	Number of function keys	58
Power supply	Power supply	24 volts of change tension or DC voltage
	Lithium battery	care of the clock with stream failure
Power consumption	up to	9 Watt
	Basicdevice	4 Watt
Dimensions	length x width x depth	310 x 310 x 60mm
Weight	without power supply	1500 g
Environment factors	Environment temperature	-20 to +70 °C, with mobile radio modem MC55 -20 to +55 °C
	Protection class	IP65 in mounted position
Software	Configuration program	Setup program for arrangement without program
	Communication tools	Communication-DLL
Data transfer	RS232/RS485/USB	RS232, RS485 and USB integrated
	TCP-IP (option)	TCP/IP use via integrated TCP/IP stack
	WLAN (option)	Wireless LAN via external access point
	Modem	analog modem or ISDN
	GSM/GPRS (option)	mobile network via GSM/GPRS = online on Int
	Radio (option)	radio module integrated, 433 MHz, to 300 meter
Reader connection	RS232 external	connection from cash code reader , magnet card
Access options MDE-Optionen	RS485 external	connection up to 8 external
	Eingänge	8 digitale Eingänge (4x für Start/Stop, 4x schneller Zähler)
machine datacollection options	input	8 digital input (4 x start/stop, 4 x quick counter)
	output	4 x open collector, optional equipment as relays
	Additional serial interface	RS232 for IO-module or communication with SP
Optionen	Fingerprint	Fingerprintmodul integriert Sensor above the LCD.
	Transponder reader	integrated: Unique EM4102, Hitag, Legic, Mifare, SimonsVoss
	Column	Column for free putting up

Table 1: Technical data of the BDE-MasterIV HW-Version 2 Subject to technical alterations.

3.2 Connection

The plug which is only accessible from behind is at the lower third of the double shell casing. In this way the plugs are completely covered when the device is mounted. Thus, the manipulability is greatly restricted. The power supply unit is at the same package dimension. See (1) figure 6.



Figure 6: Backside of BDE-MasterIV

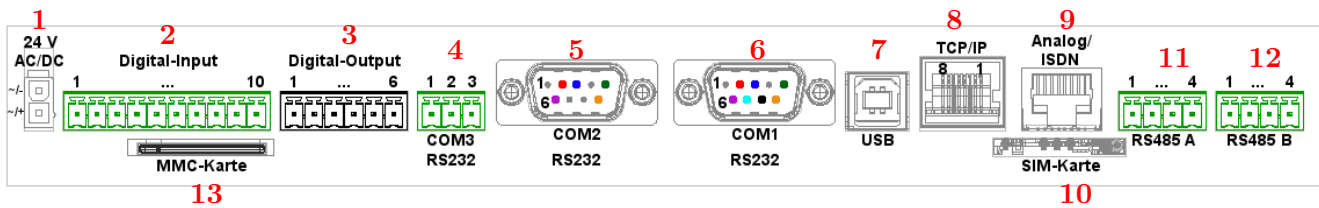


Figure 7: Edge connector of BDE-MasterIV

Designation	Plug	Pin	Description
Power supply	1		24 V 300 mA AC/DC (f a DC voltage is connected, the polarity is to be followed.)
Digital input (this are potential-free inputs)	2	1	GND of BDE-Master
		2	GND of digital input 1...8 not connected with Device GND
		3...6	Input 1...4 1kHz 0 - 3 Volt = logical 0 ($V_{ILmax} = 3,0\text{ V}$) 12-30 Volt = logical 1 ($V_{IHmin} = 12,0\text{ V}$)
		7...10	Input 5...8 10Hz 0 - 3 Volt = logical 0 ($V_{ILmax} = 3,0\text{ V}$) 12-30 Volt = logical 1 ($V_{IHmin} = 12,0\text{ V}$)
Digital output	3	1	common Contact for relay 1...4
		2...5	output relay 1...4
		6	not use
RS232 interface (COM3) for I/O-Modul, Transponder or SPS	4	1	TxD
		2	RxD
		3	GND
RS232 interface (COM2) for Barcode, Transponder or SPS	5	2	TxD
		3	RxD
		5	GND
		6	+24 V
		9	+5 V
RS232 interface (COM1) for communication with Pc or monitoring BDE	6	2	TxD
		3	RxD
		5	GND
		6	+24 V
		7	TxD (RES)
		8	RxD (RES)
		9	+5 V
RS485 interface	11	1	24V DC
		2	GND
		3	Data channel A
		4	Data channel B
RS485 interface for the access control	12	1	12V DC
		2	GND
		7	Data channel A
		8	Data channel B

Table 2: Overview over connector with pin assignment

3.2.1 Power supply

The Datafox device power supply unit is connected via the Molex connector (1), see figure 7.

!

Caution:
 In principle, only one voltage source may be connected to the BDE-MasterIV. Use a 24 V/ 300 mA AC/DC power supply unit for this. At the most one external reader may be supplied by this power supply unit via the RS485 B interface. Please note figure 53.

3.2.2 Digital Input

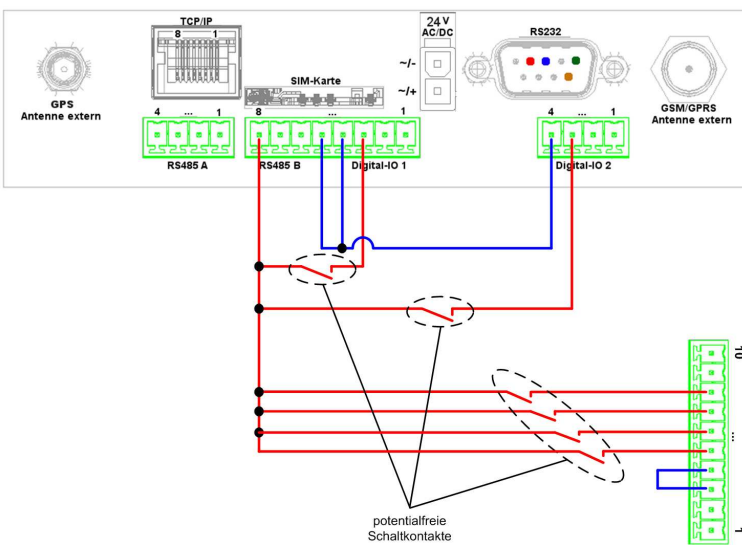
Examples for use the digital Input of the MasterIV terminals.

☞

Note:
 Please keep in mind, the 10-pole plug in the two figures below is not available by every device.

!

Achtung:
 Note in any case to proper ones Signals.

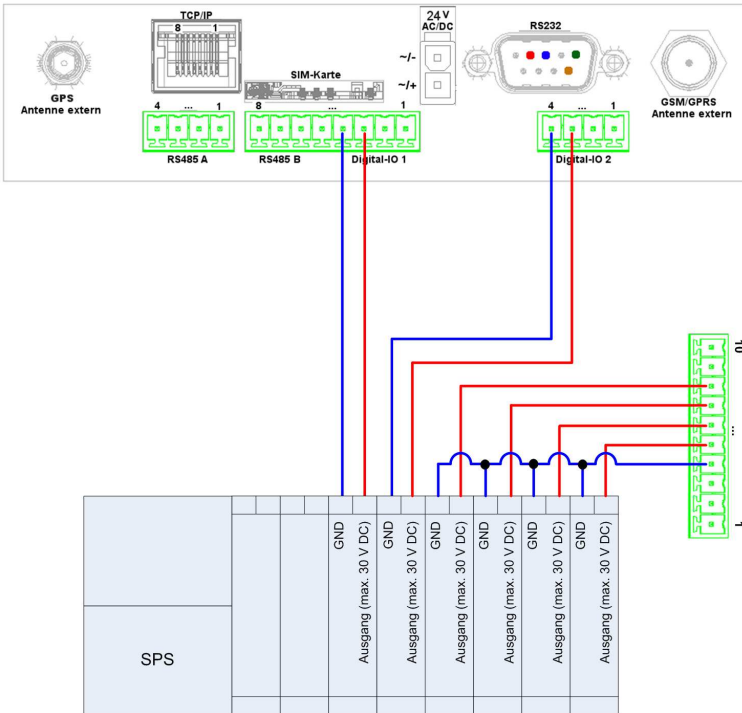


This example displays the possibility for connection of potential-free contact to the digital input.

Figure 8: Digital-Input potential-free

3.2.3 USB connector

The USB Type B connector (slave, **no** active USB controller) can optionally be led out of the device by a USB cable through the edge connector. By this, the BDE-MasterIV can be connected to a PC as USB terminal.



This example displays the possibility for connection of a SPS with 24 V output (electricity of ca. 7 mA / port).

Figure 9: Digital-Input SPS

3.2.4 Ethernet interface

!

Caution: Power over Ethernet (PoE) describes a process with which network-compatible devices can be energised via the 8-core Ethernet-wire. The internal TCP/IP module of the BDE-MasterIV is not PoE tolerant.

The device can be integrated into a network of companies via TCP/IP via the RJ45 plug (8) in figure 7.

3.2.5 Mobile communications modem

The BDE-MasterIV can optionally be equipped with a mobile communications modem for a communication via GSM/GPRS. For this purpose, at position (9) at figure 7 the slot for the SIM card can be found.

3.3 Commissioning

On delivery the device is already in working order and configured with a demo setup so that you immediately can test the input. After having plugged in the power supply unit the device will switch on automatically. The BDE-MasterIV automatically starts booting, recognition of the hardware options and loading the setups. After having finished booting the device switches to the operation. Now the BDE-MasterIV is ready for use. Only use power supply units with appropriate power to establish the power supply (see chapter 3.2.1).

On delivery the device is set for a communication over an RS-232 connection with 38400 Baud.

In chapter 3.5.1 you can find a description how to change these settings.



Note:

Before changing the communications read the corresponding paragraph in chapter 3.6.

3.4 Operation

General guidelines for the operation via keyboard



Note:

Keep to the given order of the key sequences. Otherwise, you will switch to an input chain and the desired function will not be available.

3.4.1 Keyboard

Please gather the structure of the keyboard of the BDE-MasterIV and the description of the single keys from figure 10 and the following explanations.

3.4.2 Key sequences

- ⇒ You reach the BIOS via the key sequence ESC + ↵.
- ⇒ The transponder menu is opened via ESC + F1.
- ⇒ When the device has a MMC interface, you reach the MMC menu via ESC + F2.
- ⇒ Use the keys and the menu navigation to select functions. Confirm with the ↵ key.
- ⇒ If you press ESC a return takes place in accordance with the settings in the setup program.
- ⇒ In order to select a list entry scroll with the arrow keys and confirm your selection with ENTER. Your selection is highlighted in grey.

Buzzer:

The buzzer gives a response to the data input.

1 beep = correct input

2 beeps = input error

3.5 Menu structure and menu navigation at the display

The menu items of the first level, compiled in the main menu, are automatically assigned to the function keys (2), corresponding to their order. A labelling of the single functions can be compiled in order to guarantee a better operability.

The BDE-MasterIV has a separate on-off switch (1) via which the device can be put into operation or turned off. However, it is possible to deactivate the switch via the setup. The text for the title bar (3) can

be defined individually via the setup. It is set as title for the menu at the point "Operation" with the values for "Line 1 of the display" and "Line 2 of the display". Additional configuration and operation information are displayed at the toolbar (4). For example, in the three fields on the right are displayed from right to left: the set communication (e.g. RS232), the baud rate (38400 Baud) and the bus number (Device-ID) of the device (254). In the three fields on the left are displayed from left to right: the active function key (F1 to F12), a read or write access to data records (disc symbol with w for write and r for read) and the numeric status bar in case of a GSM/GPRS connection.

If the device is in an input chain, date and time (5) are displayed below the toolbar. The text in line 3 of the display (6) is set either via the text in "Line 3 of the display" of a submenu or via the "Text in line 3 of the display" of an input chain in the DatafoxStudioIV. The matter is similar for line 4 (7). Here, the basis for the displayed information is the value from "Line 4 of the display" of a submenu or the "Text in line 4 of the display" of an input chain field.



Figure 10: Front of the BDE-MasterIV

By the vertical lines (9) between the number display (8) and the list field (11), the number of levels of

the setup, *Untermen*"u- > *Unteruntermen*"u- > ... is shown. Each line stands for one level. If you call up a list selection from the main menu level, no vertical line will be displayed. If the same call is done from the first submenu level, one vertical line is shown.

If a long list, that has more than 6 data records, has been selected, you can scroll the list in the display by one page, that means by six data records at most, with the navigation keys (12) ▲ and ▼ This is also discernible from the scrollbar (10). In this case, the data records could be menu items of a submenu or data records of a loaded list e.g. reason of disturbance list.

You can navigate through additional information via the navigation ◀ and ▶ The following information is displayed:

- ▶ Global variables with denomination and defined value
- ▶ Digital inputs with denomination and minimum/ maximum value
- ▶ Analogous inputs I with denomination and defined value
- ▶ Analogous inputs II with denomination and defined value
- ▶ Information text

The keyboard (13) makes it possible to enter any data manually. You can switch between the entry of numbers and special characters at the first level and letters at the second level by the key (14).

The user can log on at the terminal via the transponder reader (15) if the setup is configured in such a way.

3.5.1 System menu (bios)

You can make directly different basic settings at the terminal via the system menu. All settings - except the communications and the bus number - can also be made through the DatafoxStudioIV. In order to enter the system menu BIOS press a key sequence (see chapter 3.4.2). If you have a password for the system menu, enter it via the ▲ or ▼ keys and confirm it with the ↵-key. "Bios" is displayed in line 2 of the main menu.

In order to select a menu item scroll with the ▲ or ▼ keys and confirm with the ↵-key. If N/A is displayed behind a component, this component is not available. All possible actions in the bios are displayed in the footer of the display. In order to switch back step by step press ESC. This is also the way how you leave the bios.



Note:

Note the following instructions to edit the BIOS-data:

- ▶ Place the cursor via the F1 (left) and F2 (right) keys.
- ▶ Navigate in a list and change values via the arrow keys: ▲ = up or (+1) ▼ = down or (-1).
- ▶ Press ↵ ENTER to apply the changes or press ESC to reject them.

► **terminalinfo**

Display of the serial number, firmware version and build date of the firmware.

► **system**

Via *< global variables >* all defined global variables are shown with the supplied values. It is not possible to change the values. *< Double input >* defines the period of time one has to wait before the card can be read again. The range of permitted values is from 0 to 65499. You can define the display duration of the function "confirm" via *< demand timer >*. The range of permitted values is from 0 to 255. The parameter *< recordfilllevel >* displays the percentage of the capacity utilisation of the memory of the terminal.

► **communication**

First there will be an inquiry with *< break communication? >*. If you confirm with ENTER, the communication will be broken. You can detect an interruption of the communication in the toolbar when only the PZE-MasterIV symbol is displayed on the left and all other fields are empty.

■ **interface**

Here it is possible to select the communications (RS232 or TCP/IP) via the arrow keys and to confirm the selection with ENTER. Each communication has different parameters which have to be set if necessary. You can find further descriptions of the parameters in chapter 3.6.

■ **bus-number**

Für die Kommunikation über RS485 ist eine eindeutige Bus-Nummer des Gerätes innerhalb des RS485-Bus anzugeben.

■ **baud-rate**

You can select 9600, 19200 or 38400 as baud-rates.

■ **timeout[100]**

Here you can select a period of time for the communication in ms that constitutes the waiting time till the output of an error message. The range of values is between 100 and 2000. The input will be rounded down to 10.

■ **mobile**

Here you can examine the parameters for the mobile communications and enter the PIN for the displayed SIM-card. An important point is *< show gprparameters >*. Here you can check the connection parameters. You can find a further description of the parameters in chapter 3.6.5.

■ **TCP/IP**

Not all displayed values can be changed. You can find a further description of the parameters in chapter 3.6.6.

■ **bluetooth**

Not all displayed values can be changed. You can find a further description of the parameters in chapter 3.6.4.

If you press the ESC-key the device switches back to the bios menu.

► **display/buzzer**

Here you can set the optical and acoustic values of the device.

■ **LCDlighting**

You can choose between low, middle and high for the backlight.

■ **LCDcontrast**

Is display contrast is set by a value between 0 and 100.

- **buzzer**

The warning tone can be set low or loud. werden.

- ▶ **date&time**

You can set date and time here as well as the automatic change from summertime to wintertime.

3.5.2 Transponder menu

- ▶ **Type**

It shows which transponder reader is installed.

- ▶ **Write card**

If the writing of data on cards was defined via the setup - that means you have chosen one or more segments with the same format to the type Hitag1, Hitag2, HitagS 48 or HitagS 56 - you can record the data on the cards via this menu item.

- ▶ **Increment**

It defines how the value x increases the recorded segment value before recording data on the next card. If several segments are recorded with values on a card, each segment value will be increased by the value x. When you select this menu item and confirm with ENTER, you can change the value x.

- ▶ **Segment n**

It shows the segments define via the setup that can be recorded. Analogous to the increment, segment values can be changed.

- ▶ **Formatting**

With transponder type Mifare there is the possibility to activate the formatting of the sector trailer or to deactivate.

3.5.2.1 Write data on the transponder via the transponder menu

When you have entered the values for the increment and the segments that are to be written, select the menu item "Write card". After pressing ENTER, the value(s) will be displayed as contiguous string. The terminal is now awaiting a card. You will hear an acoustic signal as soon as the card is written. All segment values where the option "Auto increment" was set in the menu are increased by the increment value. When you have written all cards you can leave the menu by pressing ESC.

3.6 Communications

The BDE-MasterIV has different interfaces for communication (dependent on features and hardware version). Thus, peripheral (e.g. bar code- or IO-Module) can be connected to the device or a communication with the device is possible. The configuration can partly be done at the device, e.g. change the communication and set the baud rate. Further configuration can only be done via the DatafoxStudioIV for safety reasons, e.g. GPRS configuration.

3.6.1 Communication via RS232

3.6.1.1 Requirement

For a communication with a BDE-MasterIV over an RS-232 connection, the device has to be set for this communication in the system menu-BIOS (see chapter 3.5.1). Furthermore, baud rate and timeout of the RS232-interface of the terminal and the PC must be coordinated. Permitted baud rates are 9600, 19200 and 38400. The timeouts have to be between ≥ 100 and ≤ 2000 . When you select RS232 for communication the timeout is set on 100 by default.

3.6.1.2 Connection

A single device can be connected to the PC directly via the RS232-interface in figure 7). The cable must not be longer than 15 m. Use a RS232 cable with a 1:1 configuration, corresponding to Datafox item no. 20010, as connecting cable.

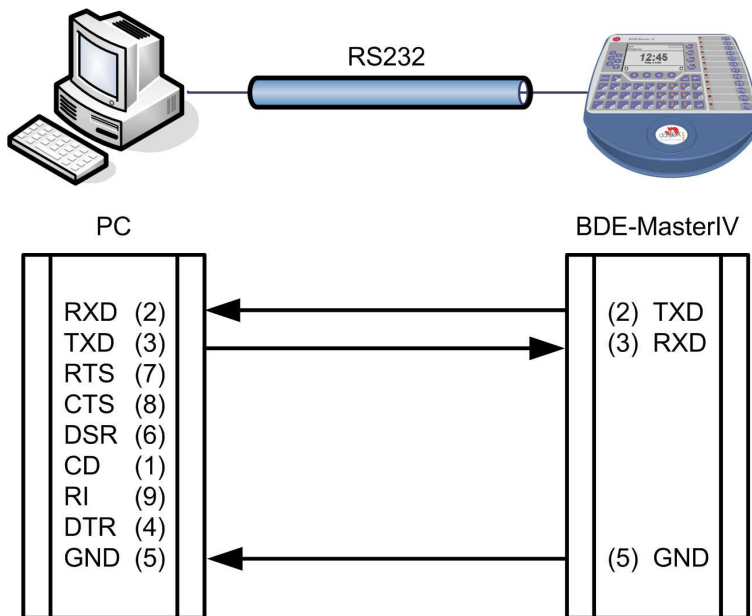


Figure 11: Connection of the BDE-MasterIV with the PC about RS232

3.6.1.3 Conversion of RS232 to RS485

Up to 31 devices can be connected to a serial interface of a PC or server via a RS232-to-RS485 converter. In this case the devices are connected via a RS485 bus. The power supply can be established using a

central power supply unit with adequate power. Note that the fall of voltage is dependent on wire cross-section and length.

The pin assignment of the converter will be demonstrated using the Datafox converter RS232/485 (small) as example. Gather the wiring of the RS485 bus from the following examples.

! **Caution:** Pay attention to the hardware version given in the examples. It is a precondition for the prevailing example.

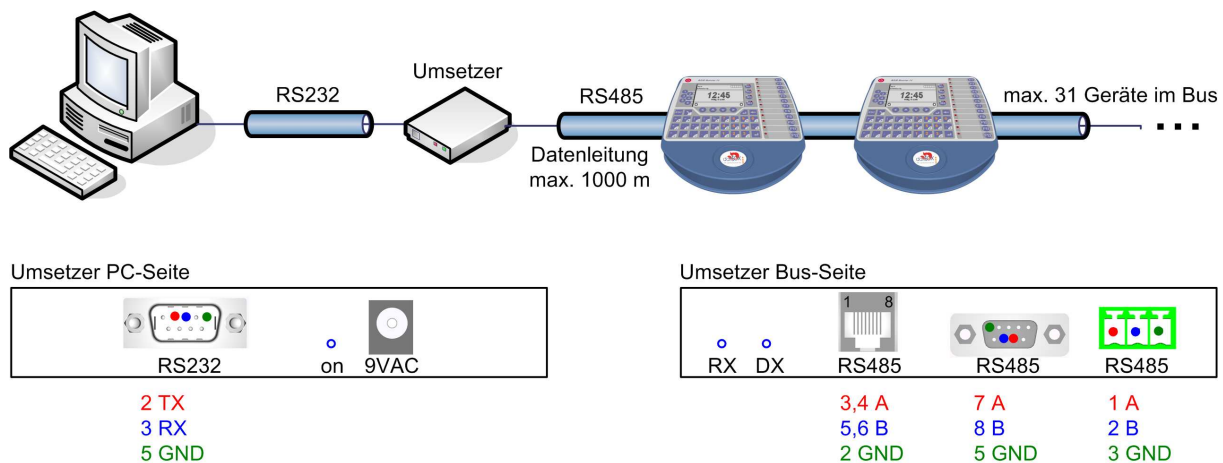


Figure 12: RS232 auf RS485 Bus

Connect the converter to the PC with a Sub-D 9-pole 1:1 cable as shown in figure 11. The converter replaces the BDE-MasterIV.

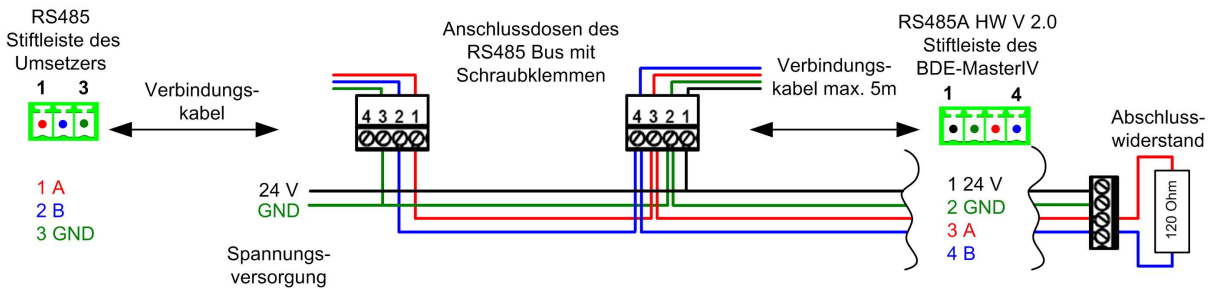


Figure 13: RS485 Bus über Stiftleisten (RS485A HW V 2.0)

PIN 1/2 in figure 13 are supply entries which make a power supply of the device via the bus possible.

! **Caution:** If the power supply of the BDE-MasterIV and the RS485 bus is established via PIN 1/4 (male connector of the BDE-MasterIV in figure 13) direct voltage must be used.

3.6.2 Communication via USB



Note:

Note that the USB-interface of the BDE-MasterIV is an USB type B. That means the BDE-MasterIV works in slave mode and therefore cannot manage other USB-devices.

3.6.2.1 Conditions

You have to install the USB device drivers and the USB serial converter drivers that are necessary to communicate via USB.



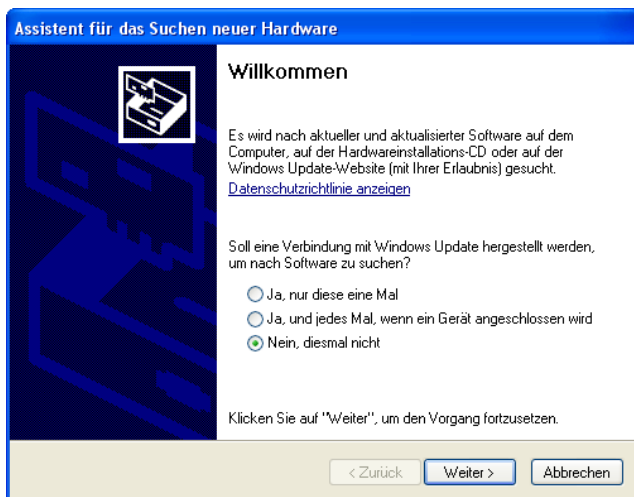
Caution:

Only use the drivers provided with the device!

3.6.2.2 Connection

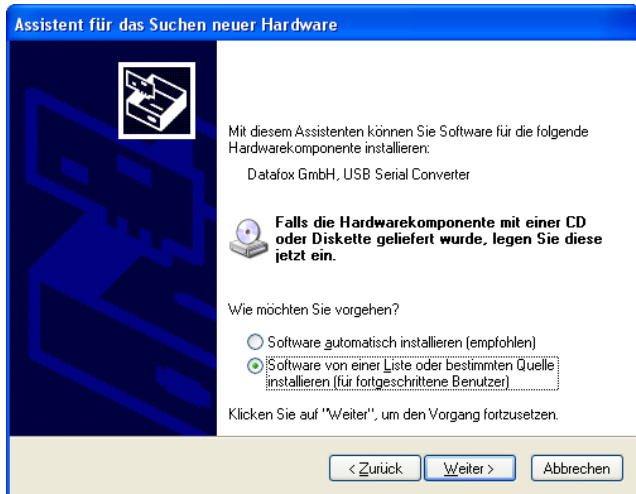
The BDE-MasterIV is connected to the PC via a standard USB cable A-B.

3.6.2.3 Driver installation



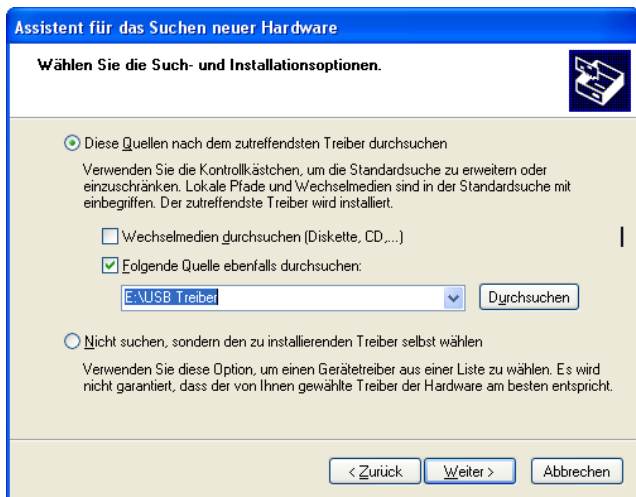
After connecting the BDE-MasterIV to the PC, the terminal is recognized as new USB device and the installation of the provided USB drivers starts.

Figure 14: Automatic start of the setup assistant



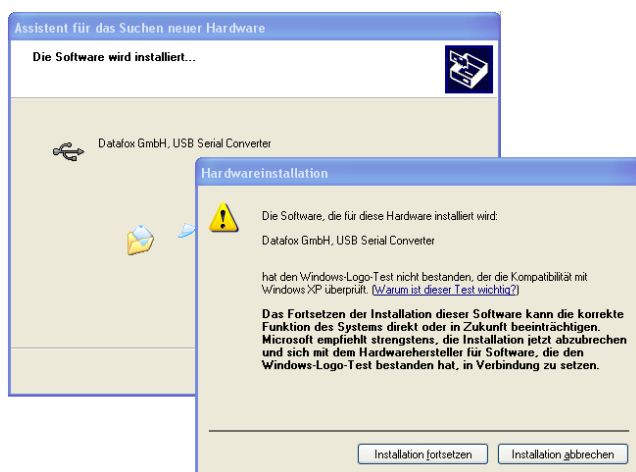
The next step is to set that you want to install the driver from a certain source.

Figure 15: Configuration of the setup assistant



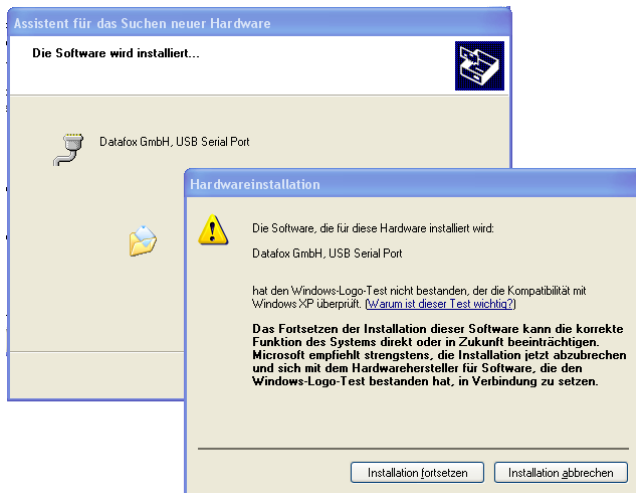
Select the folder of the driver file.

Figure 16: Selection of the source directory



Installation of the driver for the Datafox USB serial converter. The driver has no Microsoft logo, therefore the pictured message will be shown. Click on "Continue installation" to use the driver.

Figure 17: Datafox USB Converter



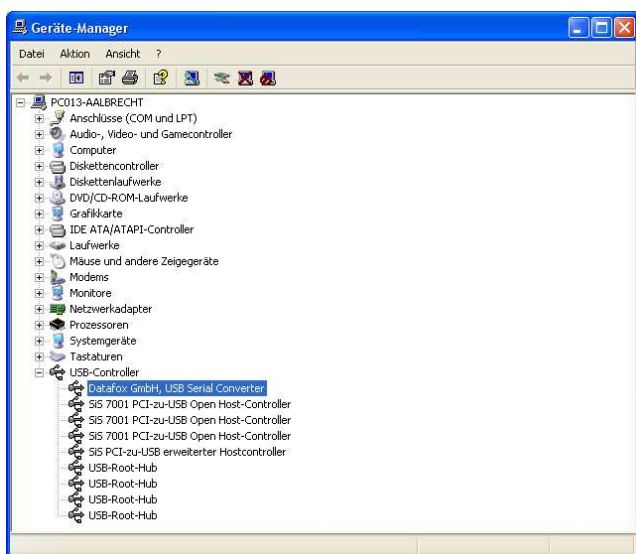
Driver installation for the virtual COM port. During this installation you will again get the message that the driver did not pass the Microsoft logo test. Click again on "Continue installation" to use the driver.

Figure 18: Virtual COM Port



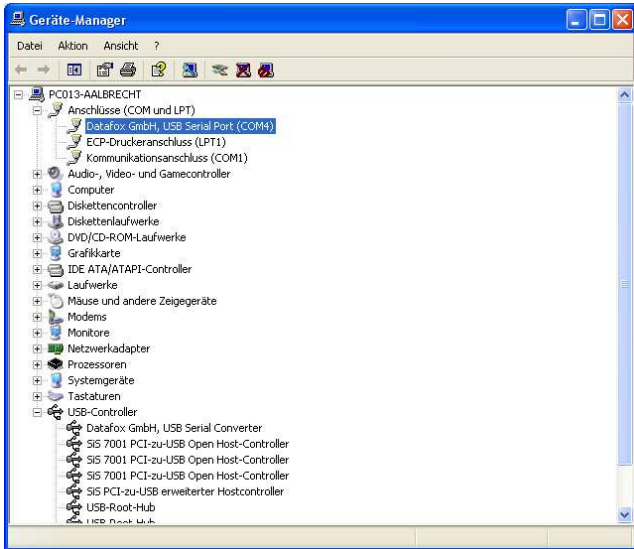
The driver installation is finished.

Figure 19: Driver installation finished



You can check the successful USB driver installation in the Device Manager. There have to be the following entries without a yellow exclamation mark.

Figure 20: Datafox USB Controller



The entry for the Datafox USB Serial Port is added as well. Via this COM-Port you can establish a connection to the BDE-MasterIV with the DatafoxStudioIV or with your own application via the DFComDLL.dll.

Figure 21: Datafox USB Serial Port

3.6.2.4 USB stick as data medium

In addition to the main communication USB, it is possible to use an USB stick as data medium. That way you can read out data records from a BDE-MasterIV and continue processing on a PC or create lists the for master data or the access control.

3.6.2.4.1 Data structure and security

In order to guarantee the data transfer between the terminal and the USB stick, you have to create a directory structure on the USB stick at first. Please use the following application for this: USBMemory-Stick.exe or DatafoxStudioIV.

Please plug an empty USB stick in the USB port of your PC before starting the program. Now start the application, mentioned above, and carry out the following steps.

In the steps 1 to 5 the data structure and the password are logged on the USB stick. With it all USB terminals are operated, irrespective of their serial number.

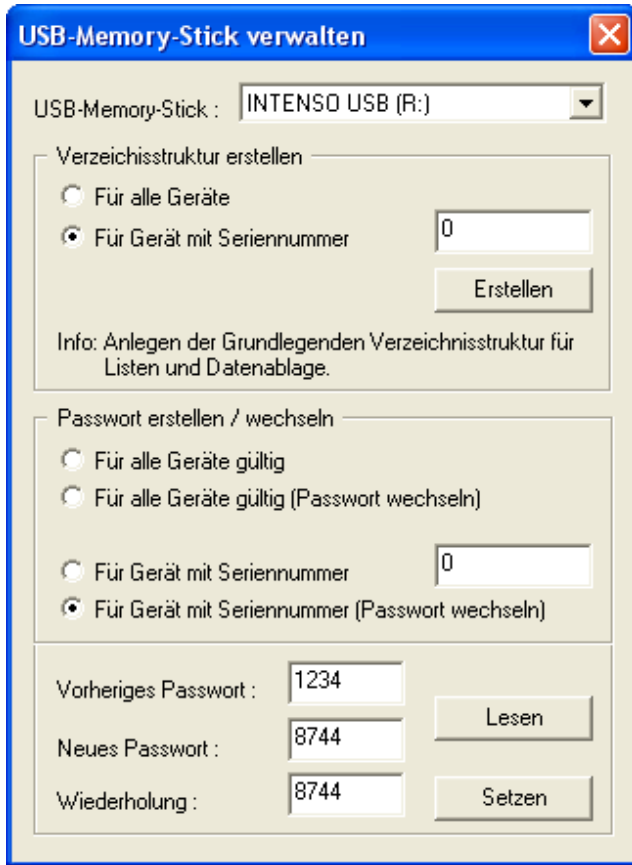


Figure 22: Configuration of an USB stick



Figure 23: File structure on the USB stick

The filing structure COMMON on the USB stick is used by all terminals, that support a main communication via USB. All *.txt files, that are filed on the USB stick, have to correspond to the list descriptions in the setup (in designation*, field size and format). Carry out a tabulator as field separator and CR + LF at the end of line.

*The designations of the text files (lists or data) can only be selected in the format 8 dot 3. That means, that each text file has to be unique on the basis of its first 8 digits. If the list descriptions are not unique

1. Select the drive, that was allocated to the USB stick.
2. Create the directory structure for all devices, irrespective of their serial numbers.
3. Create a password, that is valid for all devices. The correct password is the basis of a data transfer between the terminal and the USB stick. Thus you avoid, that any USB stick with the created data structure can read the data out of the device.
4. Log the password, e.g. 1234.
5. Set the password to the USB.

A new directory structure COMMON, that is used as filing for the transfer data, was created on the USB stick.

Create the interface folder ACCESS for the access control lists, that are to be transmitted to the terminal. The lists have to be logged as *.txt file. The folder DATA contains the data records (as *.txt file), that were recorded from the terminal on the USB stick.

In the folder KEY the key (as *.dat file) is logged, that allows a communication between the terminal and the USB stick. If no password was created, the file remains empty.

All lists (as *.txt file), that are to be transmitted to the terminal, are filed in the LIST folder.

within the first 8 digits, a termination of the communication may occur. No lists are transmitted to the terminal then.

If you want to transmit data and lists terminal oriented, you have to log an additional data structure in the following steps. The selection is based on the serial number of the terminal.

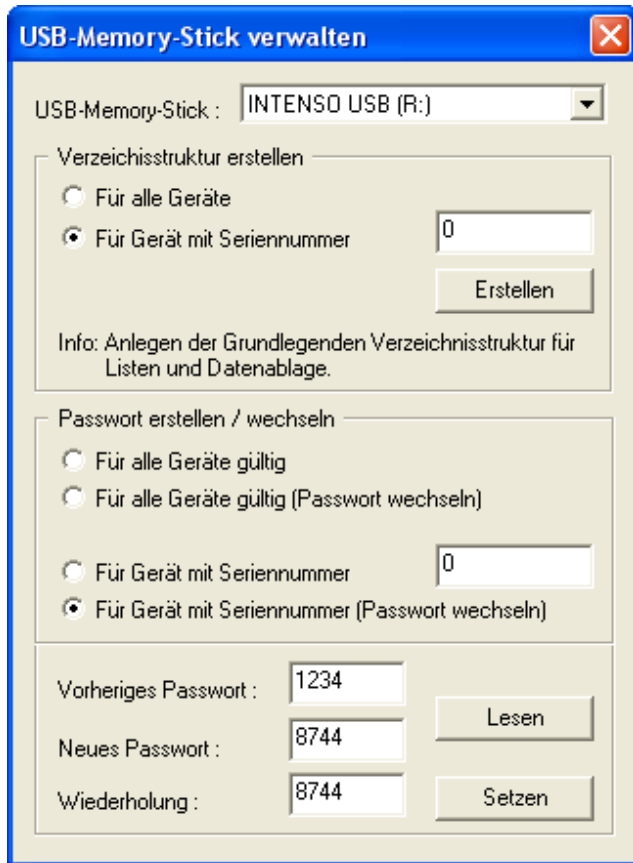
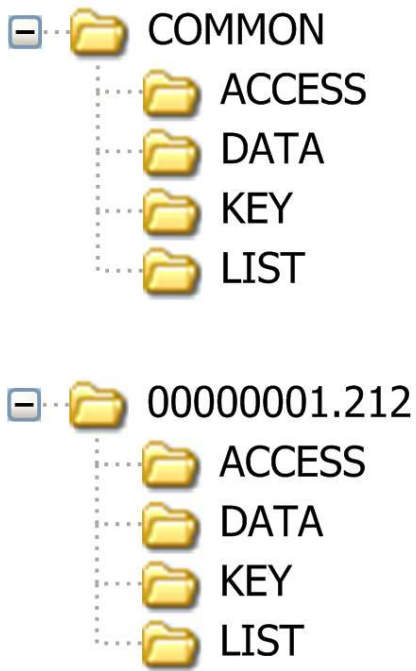


Figure 24: Configuration of an USB stick

6. Select the drive, that was allocated to the USB stick.
7. Create the directory structure for a terminal with the proper serial number.
8. Create a password, that is only valid for the terminal with the logged serial number (e.g. 1212). The correct password is the basis of a data transfer with this terminal. That way you avoid, that any USB stick with the created data structure can read the data out of the device.
9. Log the password, that shall be logged for this terminal only, e.g. 4455.
10. Set the password to the USB stick.



The already existing data structure (created in the first step) is used for all terminals, irrespective of the serial number.

Next, an additional directory structure only for the terminal with the serial number 1212 is created on the USB stick.

Interface folder for the access control lists, that are to be transmitted to the terminal (1212). The lists have to be logged as *.txt file.

The data folder contains the data records (as *.txt file), that are to be written from the terminal (1212) on the USB stick.

The key (as *.dat file) is logged on the KEY folder. It allows the communication between the terminal (1212) and the USB stick. If no password was created, the folder remains empty.

All lists (as *.txt file), that are to be transmitted to the terminal (1212), are logged on the list folder.

Figure 25: Filestruktur auf USB Stick

When communicating with the terminal (1212), the terminal only accesses to the directory structure created for that purpose. Thus, no transfer with the general directory COMMON takes place. An own directory structure can be created for each terminal.

When plugging the USB stick in the terminal for the first time, the setting and the logged password is recorded on the terminal. From this moment on, communicating is only possible, if the the correct password was entered.



Caution:

Note: This USB stick should only be used for the communication and the data transfer of terminal and PC. Data and folder structures, that are not related to the data transfer, might cause negative effects concerning the writing of data on the USB stick. A termination of communication with the USB stick may occur and data records may be damaged.

3.6.2.4.2 Change the password of the communication

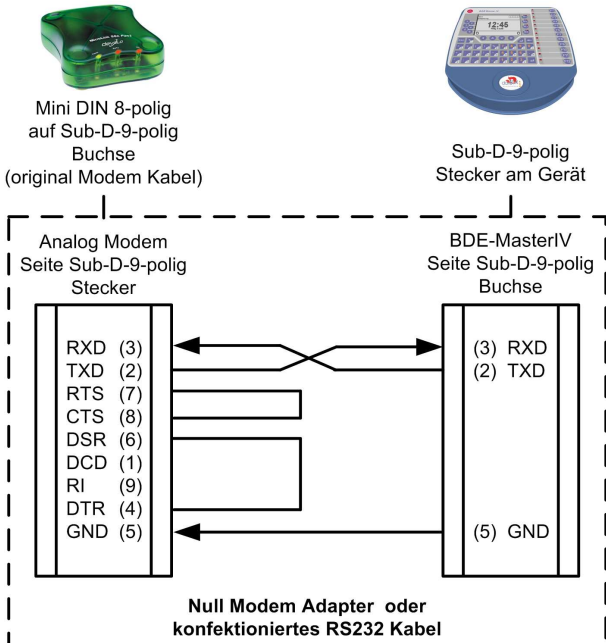
In order to change an already existing password on the USB stick and on the terminal, you have to use the same application, you already used for creating the directory structure.

3.6.3 Communication via analogous modem

3.6.3.1 Conditions

For a communication via analogous modem, you have to set RS232 as communication in the system menu-BIOS of the BDE-MasterIV (see chapter 3.5.1). The baud rate of the terminal and the connected modem must be coordinated. The timeout must be set dependent on the line quality of the telephone network (Which disturbance sources the cable is exposed to?). The worse the line quality the higher the timeout should be set. The modem to which the terminal is to be connected has to be configured via the COM-interface of a PC. The steps listed below refer to the tested and recommended "Devol-MicroLink 56k Fun II" modem.

3.6.3.2 Connection

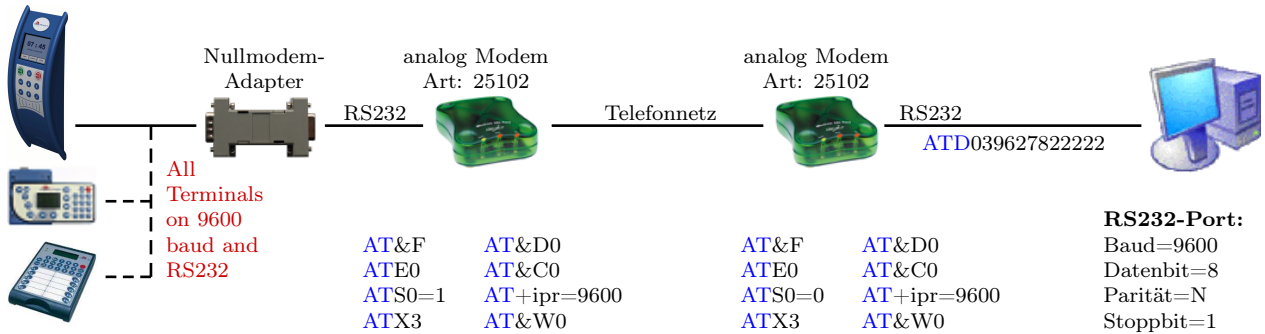


The analog modem is connected to the COM-interface of the PZE-MasterIV. Use a Null-modem-adaptor or another cable that is assembled corresponding to the figure.

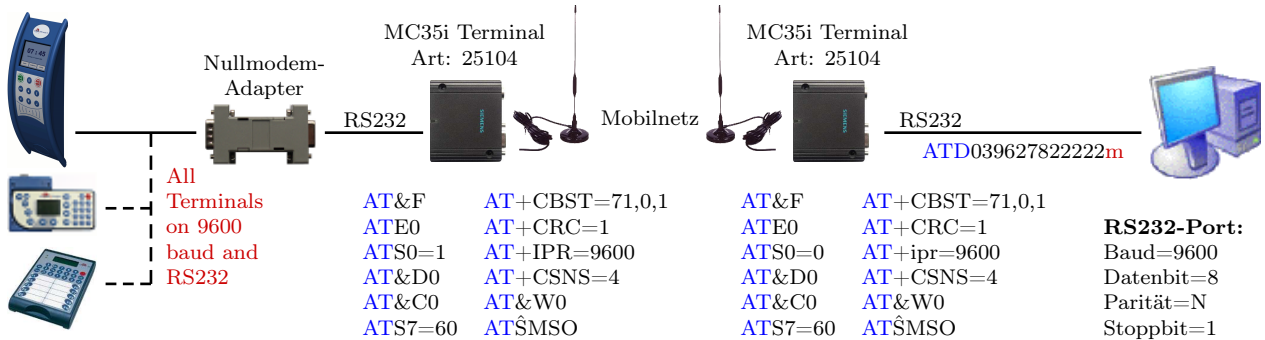
Note that at the site of the BDE-MasterIV **no** connections are bridged. You can use a Sub-D 9-pole 1:1 cable as an extension between the Null modem adaptor and the terminal.

Figure 26: Connection of the analog modem to the BDE-MasterIV

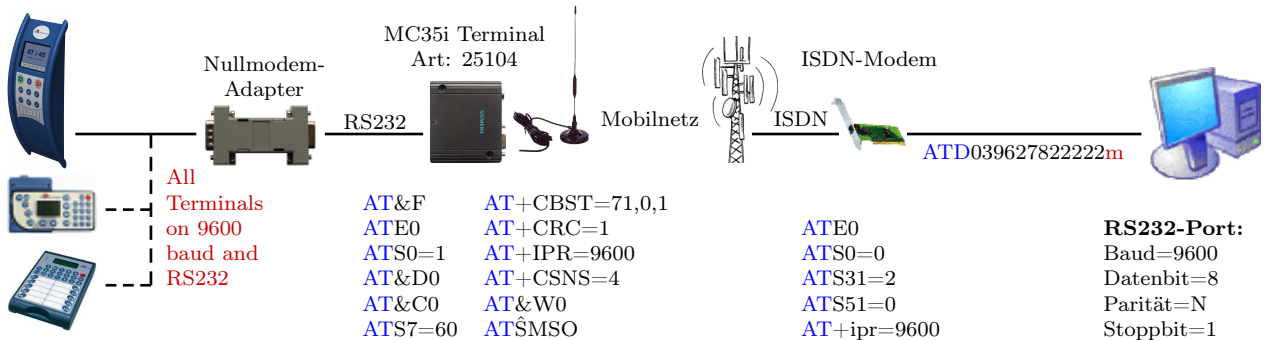
Analogous modem to analogous modem (Wiring of the Null modem adaptor see figure 27)



Mobile communications modem to mobile communications modem (Wiring of the Null modem adaptor see figure 27)



ISDN (terrestrial network) to mobile communications modem (Wiring of the Null modem adaptor see figure 27)



ISDN (terrestrial network) to mobile communications modem (internal MC35i or MC55)

All AE-IV Terminals with integrated GSM/GPRS-Modem



Note:

The configurations mentioned above are no guarantee for a connection. They are just based on experience and maybe have to be set to the different telephone systems. Configurations that are not listed here usually do not work.

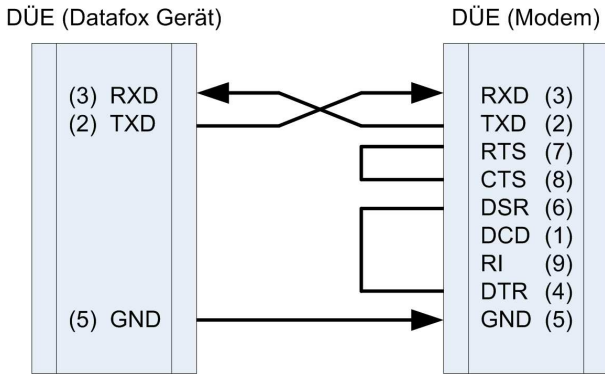


Figure 27: Wiring of the Null modem adaptor

Pin	Designation	Importance
1	DCD data carrier detect	Träger erkannt
2	RxD receive data	Empfangsdaten
3	TxD transmit data	Sendedaten
4	DTR data terminal ready	DEE empfangsbereit
5	GND ground	Signalmasse
6	DSR data set ready	Betriebsbereitschaft
7	RTS request to send	Sendeanforderung
8	CTS clear to send	Sendebereitschaft
9	RI ring indicator	Ankommender Ruf

Table 3: PIN Belegung und Kennzeichnung

Abbrevia- tion	Description
DCD	It becomes active when the connected modem has contacted another modem. It indicates the PC that a connection is established and data can be sent.
DTR	The computer signals his ready status, e.g. at a direct connection.
DSR	As response to DTR (at crossed lines.)
RTS	Becomes active when the terminal is ready to send data.
CTS	Becomes active when the terminal is ready to receive data.
RI	Is produced by a connected modem when a ring comes in.

Table 4: Description of the identifiers of the Sub-d-9-pole

Output:

Low-Pegel = + 12V

High-Pegel = - 12V

Output current: up to 10 mA

Input:

Low-Pegel is recognized till ca. + 1V

High-Pegel is recognized from ca. + 1V

Driving point impedance = 10 kOhm

3.6.3.3 Modem initialization

Check on which baud rate the BDE-MasterIV is set. You can find this information in the system menu-BIOS (see chapter 3.5.1).

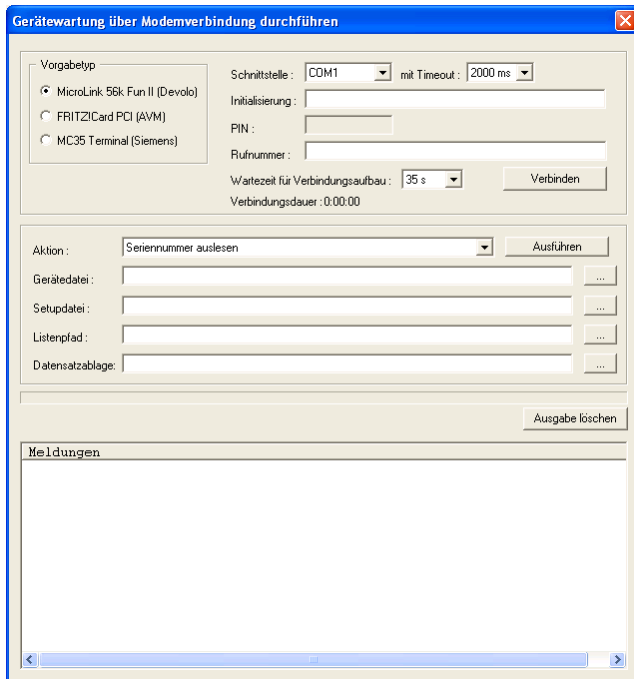


Figure 28: Configuration of the modem connection

Connect the "Devolo-MicroLink" to the COM-interface at your PC. Start the DatafoxStudioIV and open the modem configuration dialogue via *< setup => device maintenance via modem connection >*. Select "MicroLink 56k Fun II (Devolo)" as type and set a COM-interface of your PC out. Set the timeout on "2000 ms".

3.6.3.4 Connection via the DatafoxStudioIV

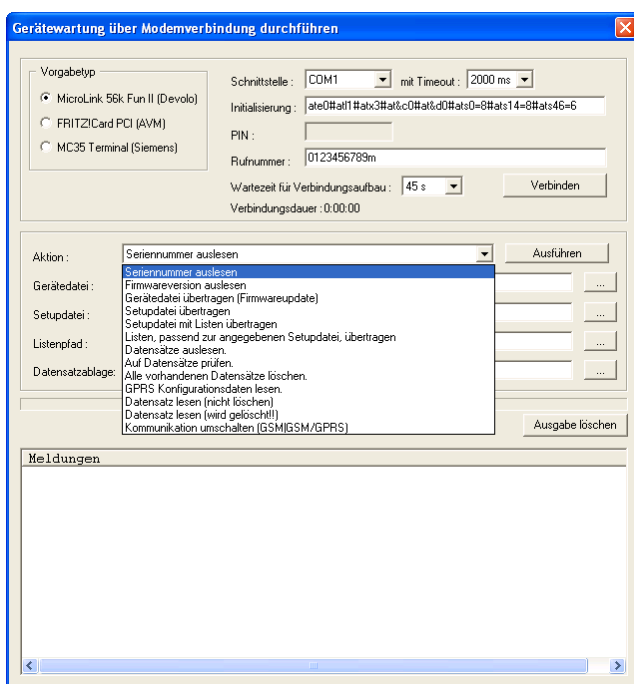


Figure 29: Dialogue for device maintenance via modem connection

Open the communication dialogue via the DatafoxStudioIV menu item *< setup – > device maintenance via modem connection >* to establish a connection between a BDE-MasterIV and a PC (DatafoxStudioIV). In dependence on the selected modem type you additionally have to set the COM-interface, baud rate, PIN and phone number of the remote station. Parameters that are not needed are deactivated.

This kind of communication is used at the administration of the BDE-MasterIV ("device maintenance via modem connection"). For this purpose different functions are available.

You can find further descriptions in chapter 4.4.6.

3.6.3.5 Connection via the DFComDLL

You can also start the connection to the BDE-MasterIV from your own application. Use the functions of the DFComDLL.dll to establish a connection between a PC and the device. Proceed as it is shown in the figure below.

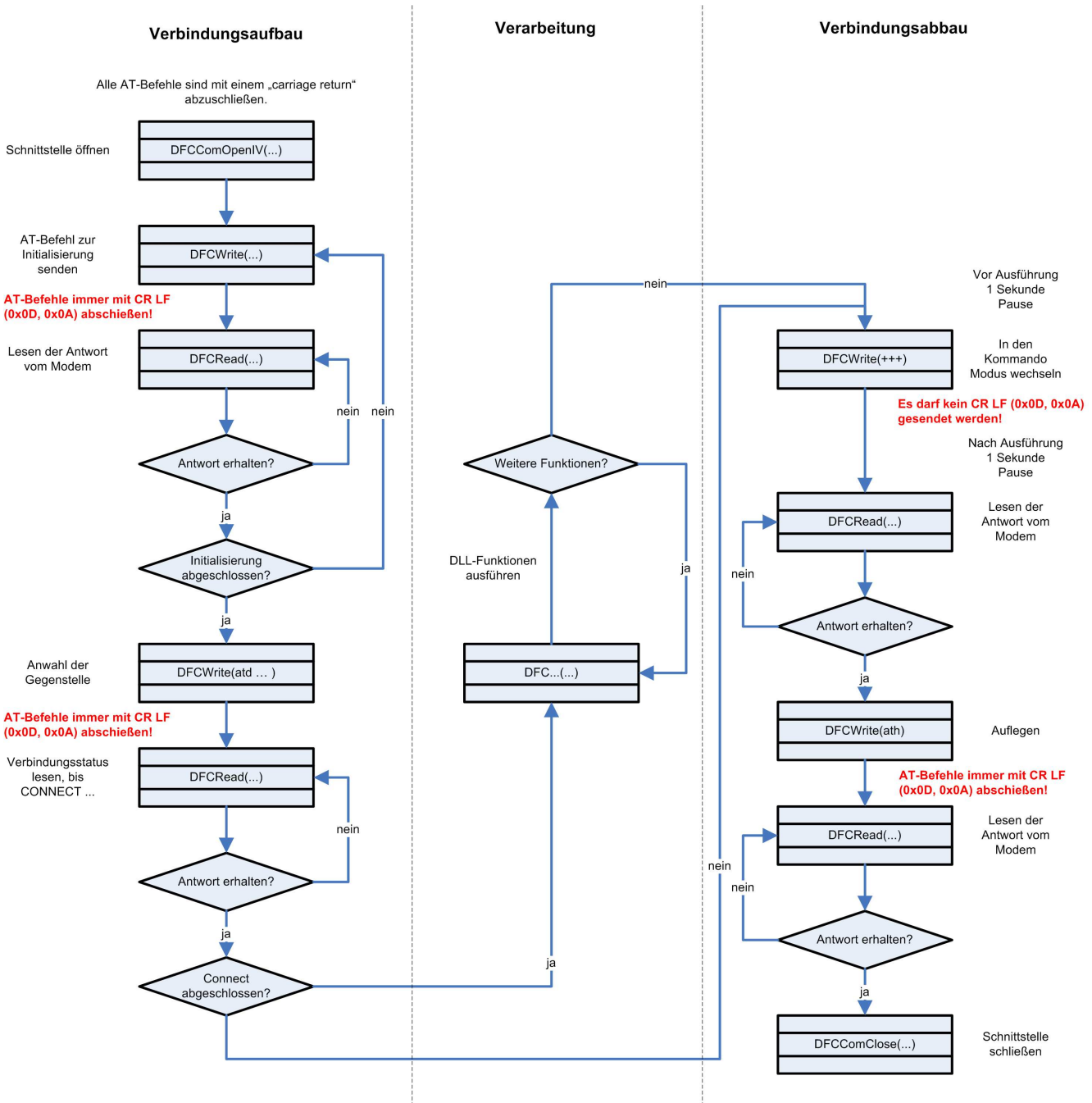


Figure 30: Course of the communication via DFComDLL.dll

You can find a more detailed description of the functions and parameters in the documentation or help to the DFComDLL.dll.

3.6.4 Communication via Bluetooth

3.6.4.1 Conditions

"Bluetooth" has to be activated as "interface" in the system menu of the BDE-MasterIV from HW V 2.0 on (see chapter 3.5.1). Additionally, you need a PDA of the type "Dell Axim x51v" where the software "DFPDACom" is installed.

3.6.4.2 Configuration

You can check the interface parameterization via the menu item "Bluetooth" and change it if necessary.

The authentication of the PDA at the terminal is done via the authentication code. This means that only persons who know this code are able to connect themselves to the terminal via a PDA where the necessary software is installed.

You should change the standard "authentication"-code before the first communication with a PDA at the terminal for safety reasons. Go to the system menu bios of the BDE-MasterIV (see chapter 4.5.13). Select the menu item "Authentication" in the submenu < communication => bluetooth >. Confirm your selection with the ↵ key. A box opens and you can change the cursor position via the "F1" and "F2" keys and the value of the numeral via ▲ and ▼ at the selected position.

If you connect a PDA (DFPDACom software) to the BDE-MasterIV for the first time, a connection profile will be created. In this profile is provided which PDA was connected to which terminal. The "authentication"-code is provided as well. This connection profile will be used for all further connections between these two devices. You can gather from the manual for the DFPDACom software how to configure a connection profile (chapter 4.3 "Seek device and establish connection").

3.6.5 Communication via GSM or GPRS/GSM

The BDE-MasterIV can optionally be equipped with a mobile communications module (Siemens MC35i, MC39 or MC55) for GSM and GPRS to use it at locations without fixed or DSL network.



Caution:

GSM and GPRS are services that generate costs. Contact your provider to get further information about tariffs and generated costs.

Via GSM all functions of the DLL can be used. Currently, GPRS is used only to send data from the BDE-MasterIV to a web server. The advantage is that the data is sent immediately.

3.6.5.1 Preparation

Put the SIM-card in the BDE-MasterIV before bringing the device into service. An external aerial has possibly to be connected; this depends on the selected hardware option (internal or external aerial). See

chapter 3.2.5. In the BIOS of the BDE-MasterIV "GSM" or "GPRS/GSM" has to be activated as interface (see chapter 3.5.1).

3.6.5.2 Configuration



Caution:

Starting from version 04.01.06 the internal TCP/IP stack of the modem is used. An existing GPRS radio connection is cut when no data is send for a period of 20 seconds after the last HTTP communication. With the next data the modem dials in again. This can cause higher communication costs, especially with low volume rates. This timeout is increased from 20 seconds to 8 hours from version 04.01.06.16.

You have to create a configuration file with the access data of your provider and transmit it to the device to use "GPRS/GSM". See chapter 4.5.12 for further descriptions of the parameters, the creation and the transmission to the device.



Note:

Note that the GPRS configuration files can be transmitted to the device only with the DatafoxStudioIV via RS232 or TCP/IP.

A communication via GPRS requires "GSM", therefore a SIM-card has to be put in the device (see chapter 3.2.5). For the SIM-card activation in the BDE-MasterIV the following scenarios are possible:

- 1.) You want to switch from another communication to a communication via "GSM" or "GSM/GPRS". Remove the device from the power supply and display the SIM-card. Go to the bios modus via the DatafoxStudioIV and set the interface at "GSM" or "GSM/GPRS". Transmit the changed bios configuration to the terminal and leave the bios modus.
- 2.) You want to switch from another communication to a communication via "GSM" or "GSM/GPRS". Remove the device from the power supply and display the SIM-card. Go to the bios modus via the DatafoxStudioIV and set the interface at "GSM" or "GSM/GPRS". Transmit the changed bios configuration to the terminal and leave the bios modus.



Caution:

If a wrong PIN was transmitted to the device three times, the PUK has to be entered together with the PIN to activate the SIM.

3.6.5.3 Connection state

After transmitting the ini-file to the device the operating mode of the BDE-MasterIV can be set in the system menu bios < *communication* => *interface*.

GSM: The communication takes place via GSM.

GPRS/GSM: The data records created in the device are sent immediately to a corresponding web server via GPRS. All other functions have to be carried out via GSM.

If GSM is activated, "GSM" is shown in the status line of the BDE-MasterIV. In the symbolic strip of the BDE-MasterIV a mast with rays is indicated, if the modem is logged in in the net, otherwise the mast has no rays.

The state of the GPRS-/GSM-connection can always be read in the status line of the BDE-MasterIV on the LCD-display (third field from the right).

State display for BDE-MasterIV (valid from version 04.01.05.x on):

- 0 Modem OFF
- 1 Initialization of the software
- 2, 3 Start of the modem
- 4, 5 Initialization of the modem and SIM-card check
- 6 If PIN necessary, sending of the PIN
- 7 If PUK necessary, sending of the PUK

- 10 Modem in standby mode
- 11 Call recognized
- 12 Take calls
- 14 GSM connection active
- 15, 16 Quit GSM connection

- 20 GPRS standby, dialling only after present records
- 21 Initialization of the GPRS connection
- 22 GPRS initialization
- 23 Connection via provider
- 24 - 26 Synchronization of the participants
- 27 DNS inquiry for IP

- 30 GPRS standby (wait for data)
- 31 Connecting to the server (open)
- 32 Connection to server established (wait for data)
- 33 Send data to server (http)
- 34 Wait for quitting from server (http)
- 35 Package received (tcp/ip)
- 36 Package send (tcp/ip)
- 37 Connection tear-down (close)

- 40 Device regeneration after connection error with time-out of approx. 15 minutes

- 50 - 53 Disconnection with provider
- 55 Turn modem off

3.6.5.4 Send data via GPRS

The BDE-MasterIV can send booking data promptly to a web server via GPRS. For this it is necessary to configure the device for this communication as described above. When data is created in the BDE-MasterIV, firstly a TCP/IP connection is established and then the following character string is sent:



Caution:

Currently, no blanks or umlauts can be transmitted via GPRS. This problem is known and dealt with.

GET example/getdata.php?table=datensatz¶meter1=wert1¶meter2=wert2&checksum=pruefsumme

- ▶ GETexample/getdata.php? is the prefix of the HTTP data and gives the path on the web-server where the php-script is with which the HTTP data are processed.
- ▶ Table is a data record description from the setup (the table from which data are to be transmitted).
- ▶ Parameter *n* describes the field names from the data record description (table field).
- ▶ Checksum is to detect errors at the data transmission

You should enter only a few characters for the tables and field names to have a small transmission volume.

The checksum is the sum of all ASCII values of the transmitted parameter values (only of the values, not of the field name; that means everything that is written between = and &). The web-server has to send back the following answer within HTTPTIMEOUT:

- 1.) Success (checksum correct): status=ok&checksum=pruefsumme Then the data record is deleted in the BDE-MasterIV.
- 2.) Error (checksum incorrect): status=error&checksum=pruefsumme Then the last data record is sent again.



Caution:

Every answer string from the server has to end with 0x0D 0x0A.

As fixed parameters it has to be given:

"status=ok&checksum=" or "status=error&checksum="

The following optional parameters are allowed:

"&time=" the timestamp of the server is passed

"&message=" a message is passed to display it

"&delay=" sets how long a message is displayed

"&beep=" sets the kind of signal 0 = none, 1 = 1 x long, 2 = 2 x long,

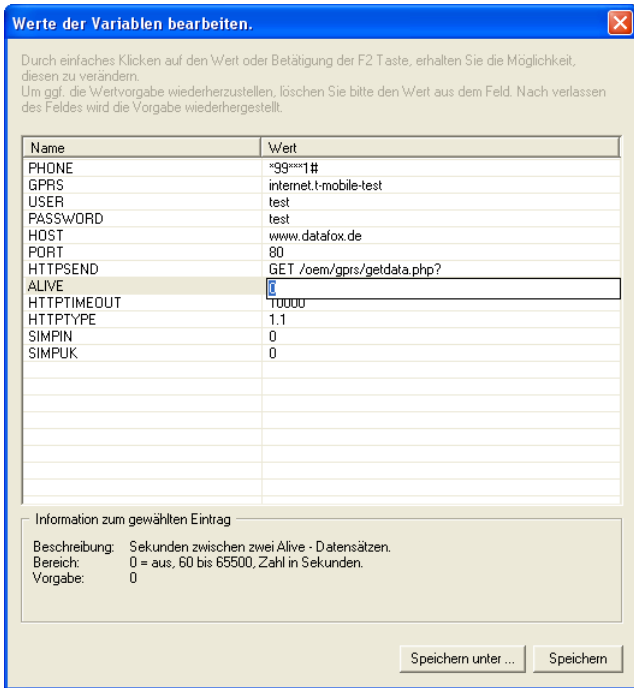
3 = 1 x short, 4 = 2 x short and 5 = 3 x short

If you want to adjust date and time of the BDE-MasterIV and the server, you can do it in the answer to the BDE-MasterIV as in the following example:

status=ok&checksum=3142&time=2003-10-28_17:00:55

Now the BDE-MasterIV sets its internal clock on 17:00:55 and the date on 28 Oct 2003.

If connection problems occur, the error analysis can be simplified with the help of an alive-data record. Via the alive- data record you can detect if the device was on- or off-line, e.g. at the moment of power outage. You also can detect if the web-server was reachable all the time with the aid of the alive-counter in the alive-data record. With each failed attempt to send data the alive-counter increases. If no data reach the server and the alive-counter in the alive-data record has the value 1, the device has been removed from the power supply.



Activation of the function Alive via the parameter "Alive" (cycle for the creation of the alive-data record in seconds) with a value higher than 60 and lower than 65500.

The data fields of the alive-data record you should define in any case are the device number, date and time and the alive-counter.

The value of the alive-counter * cycle for the creation = duration of interference. With this formula you can calculate the duration of interference via the alive-counter.

Figure 31: Activation of the alive-data record

Note: After three failed attempts to send data, the BDE-MasterIV starts the device regeneration with a timeout of 15 minutes. When the timeout is run out three attempts to send the data are started again. Thus, the generation of unnecessary costs is prevented.

Caution: Alive data are temporary data. If the alive-data record cannot be sent (e.g. server is nor reachable), it will be deleted and the alive-counter will be increased by one. The function "alive" is activated via the alive parameter in the GPRS.ini. Additionally to the activation the F6-chain or (from version 04.01.04.x on) or the GPRS-chain has to be available in the signal processing. Take care that this function does not create unintentional data (traffic).

3.6.6 Communication via TCP/IP

Usually, the configuration of the network connection is necessary to integrate a BDE-MasterIV. But if a DHCP server, that supplies all PCs and peripheral with dynamic IPs, is available in the network, this configuration can be omitted. In this case the IP of the terminal has to be set on "000.000.000.000".

- ▶ **version** fixed value
- ▶ **MAC** fixed value
- ▶ **IP** changeable value
- ▶ **port** changeable value, analogous IP
- ▶ **hostbits** changeable value, analogous IP
- ▶ **gateway** changeable value, analogous IP
- ▶ **remoteaccess** changeable value you have the choice between **yes** and **no**.
- ▶ **set default** the default values of the device are set

A possible access protection per Telnet or web interface to the TCP/IP module of the Datafox terminal is deactivated after a restart of the device.

Starting from version 04.01.06.16 the following security mechanisms are available:

Variant 1 A complete protection of the terminal against remote access (Telnet-session, web interface) is possible by deactivating remote access in the BIOS of the device. Then TCP/IP settings are only available at the terminal itself.

The settings for the remote access (yes / no) in the BIOS can only be changed if the BIOS is protected by a password. This means that after a firmware update it is necessary to transfer a setup with a BIOS password before the settings can be changed.

This additional protection is necessary because a change of this setting (remote access yes/no) deactivates a probably set Telnet password.

Variant 2 In a Telnet session you must set the value for "Enable Enhanced Password" to y (yes) in menu 6. Also set the value for "Change the password" to y (yes) and enter the password. Save these changes at menu item 9, Save and Exit. With these settings you have protected the access per Telnet as well as per web interface with a single password. With this variant you can still change the settings per remote access.



Caution:

Important! A change of the setting remote access in the BIOS of the device deactivates the Telnet Enhanced password. This can be desired if you forget the password and want to reset the terminal. To do so you need the BIOS password which can be found in the devices setup.

A firmware update has no influence on the security settings of the terminal!

3.6.6.1 LAN

Analogous to the direct connection via RS232 a single device can be connected directly to the PC via TCP/IP. In this case the device is connected to the PC with a CAT-5 network cable (in case of direct connection with crossover; in case of connection via router,... with patch cable) via the RJ45 jack.

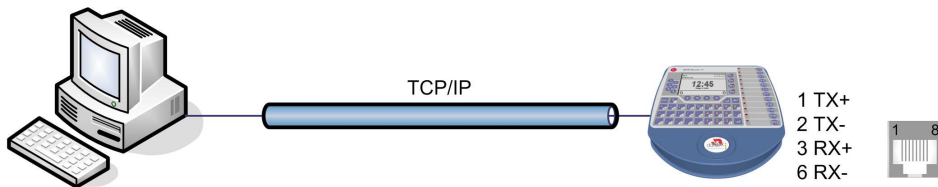


Figure 32: Connection to the PC via TCP/IP

3.6.6.2 Transition from TCP/IP to RS232

In order to connect a single device via RS232 to a TCP/IP network a COM-server has to be used. The COM-server serves as converter.

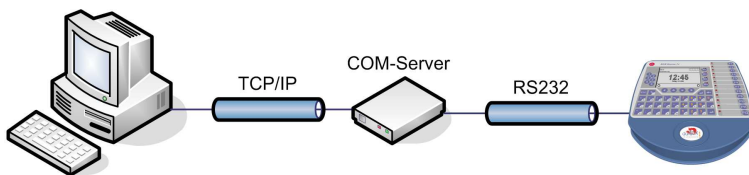


Figure 33: TCP/IP to RS232

The necessary settings of the COM-server will be explained using the W&T COM-server as example. The COM-server can be configured easily via the Wutility.exe program.

- 1.) Open the W&T program
- 2.) Open "inventory" and then "scan local network"
- 3.) Mac-address is displayed at the menu; click on it
- 4.) Adjust IP-address via "Configuration" and "Assign IP-Address"
- 5.) Click on telnet (screen) button
- 6.) The telnet menu is shown
- 7.) Press key 3 (setup port 0) and then 2 (UART setup)
- 8.) Further settings see below
- 9.) Save setup and close program
- 10.) Hardware settings see manual of the COM-server

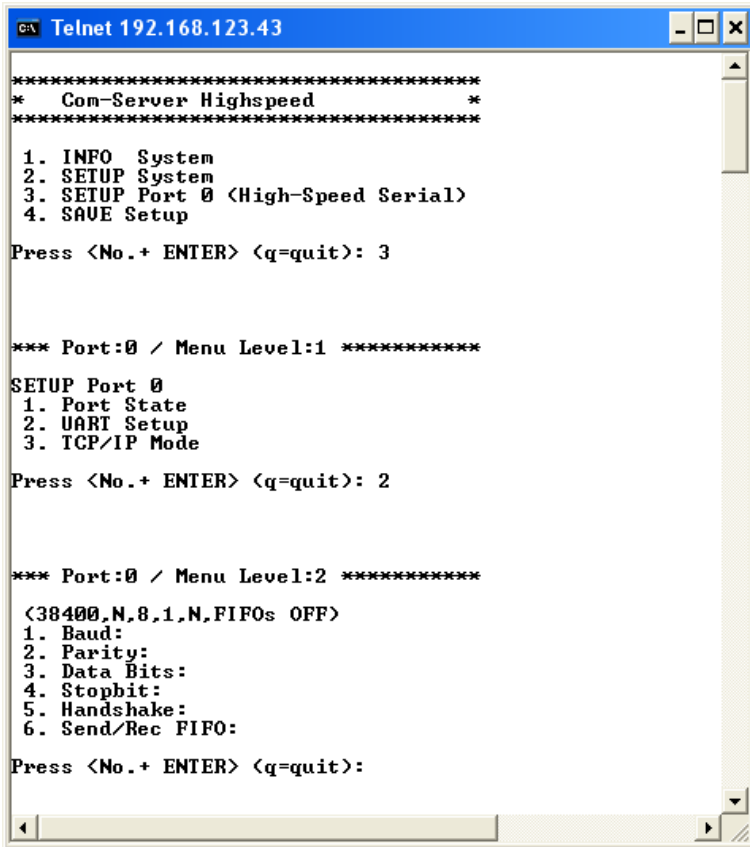


Figure 34: COM-Server configuration over telnet

3.6.6.3 Transition from TCP/IP to RS485 Bus

Up to 31 devices can be connected economically via a COM-server with RS485 bus. You can find details about the structure of a RS485-network in the separate networking description. You can request it from us or download it from our homepage. Please note that the bus number has to be set directly at the terminal (see chapter 3.5.1).

The network structure is a bus. The bus cable is looped through from one device to the other. Branching is not allowed. The PC can be connected at the beginning, the end or somewhere in the middle of the network. The total length of the bus cable must not exceed 1000 m.

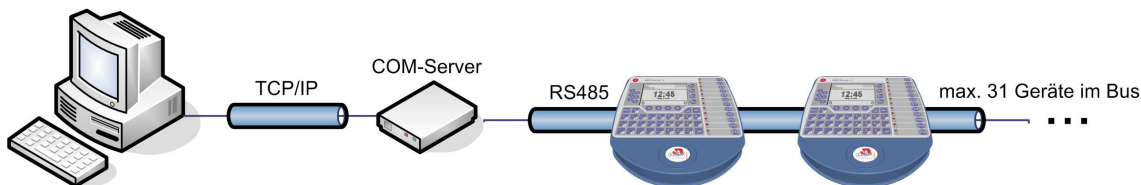


Figure 35: TCP/IP to RS485 Bus

3.6.6.4 WLAN

The BDE-MasterIV can be integrated into a WLAN with a WLAN router via TCP/IP. Please note that a WLAN router is an external component and that you have to pay attention to the compatibility to the present network topology. You have to set the IP-addresses in the system menu bios of the BDE-MasterIV and the WLAN router in accordance with the network class of the present network.

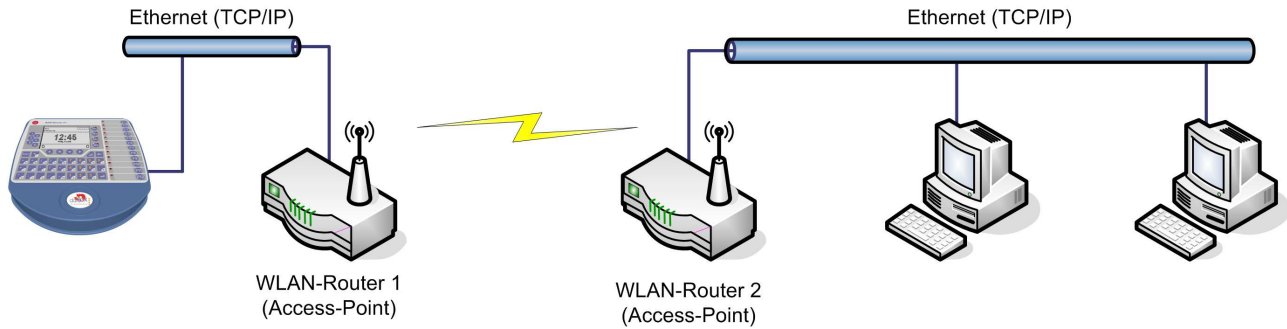


Figure 36: Connection of a BDE-MasterIV via WLAN router to a WLAN network of a company

3.6.7 Communication via RS485

The RS485 Datafox Network is based on Modbus. Modbus is a simple and safe bus system and is also used in measurement technology.

RS485 is no standard communication of PCs, therefore you need a converter to set up this kind of network. See chapter 3.6.1.3 for the connection and the wiring for a transition from RS232 (PC) to a RS485 net and see chapter 3.6.6.3 for the transition from TCP/IP (PC) to a RS485 net.



Note:

All components for the RS485 - interlinking can be ordered with the devices. You find the articles in the suitable price-lists or on inquiry.

The bus line connects the converter and 31 BDE-MasterIV at most in series. Branching is not allowed. The converter can be connected to the bus line at any place. The maximum total length of a bus cable is 1000 m. The bus line should be laid in trunkings at the ceiling or the wall. In order to connect a BDE-MasterIV the data line is wired to a Cat. 5 outlet and connected via a RJ45 patch cable or via outlets with terminal strips via a stub line from the RS485 bus to the terminals. You can connect one Datafox-Bus per RS232 interface at the PC. You can install as many busses as you like also at different PCs. One communication program per bus is active to operate the communication between the single devices and the central data server. Because of potential differences a Datafox-Bus line should not be laid between different buildings. This connection should be mainly realized via the PC network via glass fibre.

3.6.8 Active connection via TCP/IP

An active connection is supported from the firmware version 04.01.05.x on. This function is available for the main communication TCP/IP, WLAN and GPRS (only from the GSM-module MC55 on)

The connection is always bidirectional full-Duplex. The communication is based on the Datafox protocol of the MasterIV series.

3.6.8.1 Description

The concept for an active connection contains the realisation of an initialisation of the TCP/IP connection between the device-software (firmware) and the DLL-software. The connection is always initialized by the firmware. The link negotiation is done via appropriate commands with the DLL.



Note:

Note: For most providers a TCP/IP connection establishment "from the outside" is not possible. Therefore the connection has to be established by the firmware. Either the connection requests are blocked directly by the provider or the IP-address established by the PC is not the real one of the device.

A connection establishment can be done in TCP/IP networks (also GPRS). The devices do not permit several connections at the same time. Therefore no other connections must be established in order to initialize the connection establishment.

In principle, a connection request of a Device to the DFComDLL is processed as follows:

The DLL receives a connection request on a listen socket. The connection administration checks, whether a port object can be created. After creating a port object, the connection is established and remains for further applications.

3.6.8.2 Configuration of an active connection

An active connection requires that the following parameters are set or configured in the BDE-MasterIV or the application (DFComDLL.dll):

- ▶ **com.active** (0 = deaktiviert, 1 = aktiviert) Switching on/off the active connection.
- ▶ **com.notify** (0 = deaktiviert, 1 = aktiviert) Switching on/off the active data record message.
- ▶ **com.prio** (0 = höchste, 65535 = niedrigste) Priority of the event messages in the queue.
- ▶ **com.host** (0.0.0.0 bedeutet alle) Host to one connection should be produced.
- ▶ **com.port** Port to one connection should be produced.
- ▶ **com.retry** Number of the attempts for connection setup.
- ▶ **com.timeout** Time out, after the set number has failed because of connection setup attempts.
- ▶ **com.repeat** The time out if by successful message about present records these were not retrieved, until a renewed message should be carried out.
- ▶ **com.alive** Time out, when the terminal diminishes an existing communication channel (connection quit) if no Kommunikation takes place. The DLL must send, if a communication channel should not be diminished, cyclically a Ping to the BDE-MasterIV.
- ▶ The bus address of the DLL (for call of DFComOpenIV) is firmly given with 31. The number of at the same time existing connections is delimited per DLL instance to 50 connections.

Here you have to pay attention to the following value margins and default values:

Description	Name of the system variable	Range of values	Default value
Activation	com.active	[0..1]	0
Active data record message	com.notify	[0..1]	1
Priority	com.prio	[0..65535]	0
Host	com.host	[IP-Adresse]	0.0.0.0
Port	com.port	[0..65535]	8000
Connection	com.retry	[0..65535]	3
Communication timeout	com.timeout	[0..4294967295]	900
Notification retry	com.repeat	[0..4294967295]	60
Connection check	com.alive	[0..4294967295]	0

Table 5: Parameters and default values for the configuration of an active connection

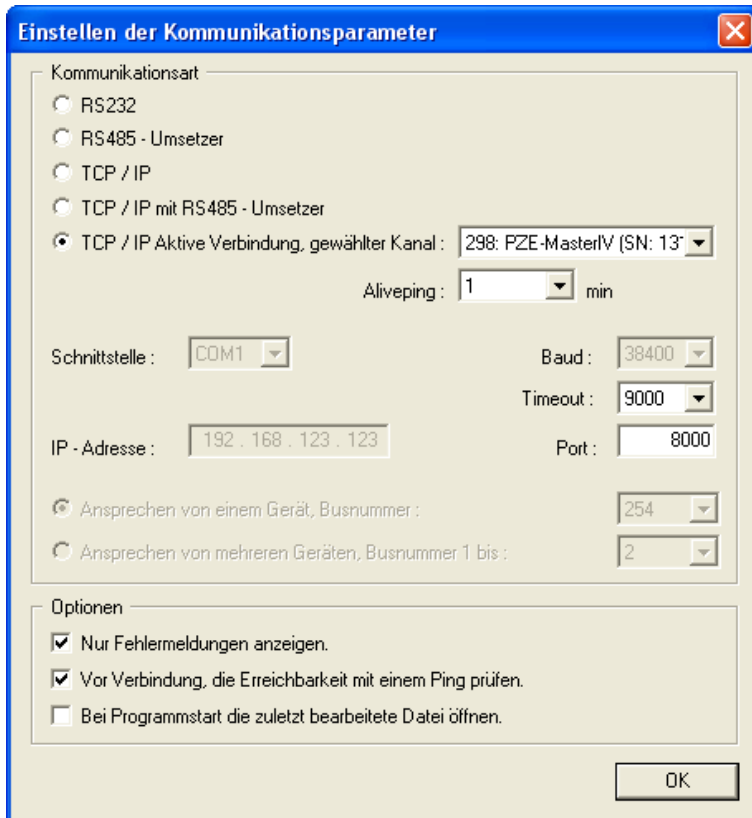


Figure 37: Active connection configuration

The parameters can be changed via the dialogue active connection configuration in the communication menu and be transmitted to the BDE-MasterIV. You may find information about the single parameters in the table 5.

Grafik muss noch angepasst werden

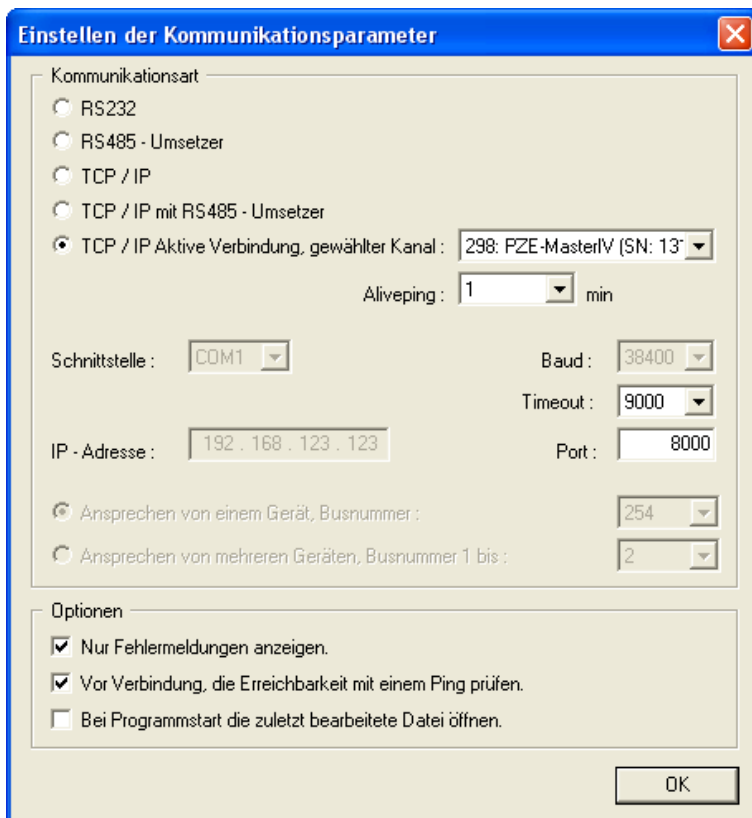


Figure 38: Setting the communication via the BDE-MasterIV

The configuration of a BDE-MasterIV via the DatafoxStudioIV with an active connection requires an active communication port (selected port: see figure on the left) from the device to the DLL. Set the alive ping, the communication timeout and the port according to your demands on the configuration. Afterwards all functions of the DatafoxStudioIV can be used in order to configure the device.

3.6.8.3 Device servicing via active connection

The following overview shows you the single procedures of the active connection and the possibilities for the servicing of the terminals.

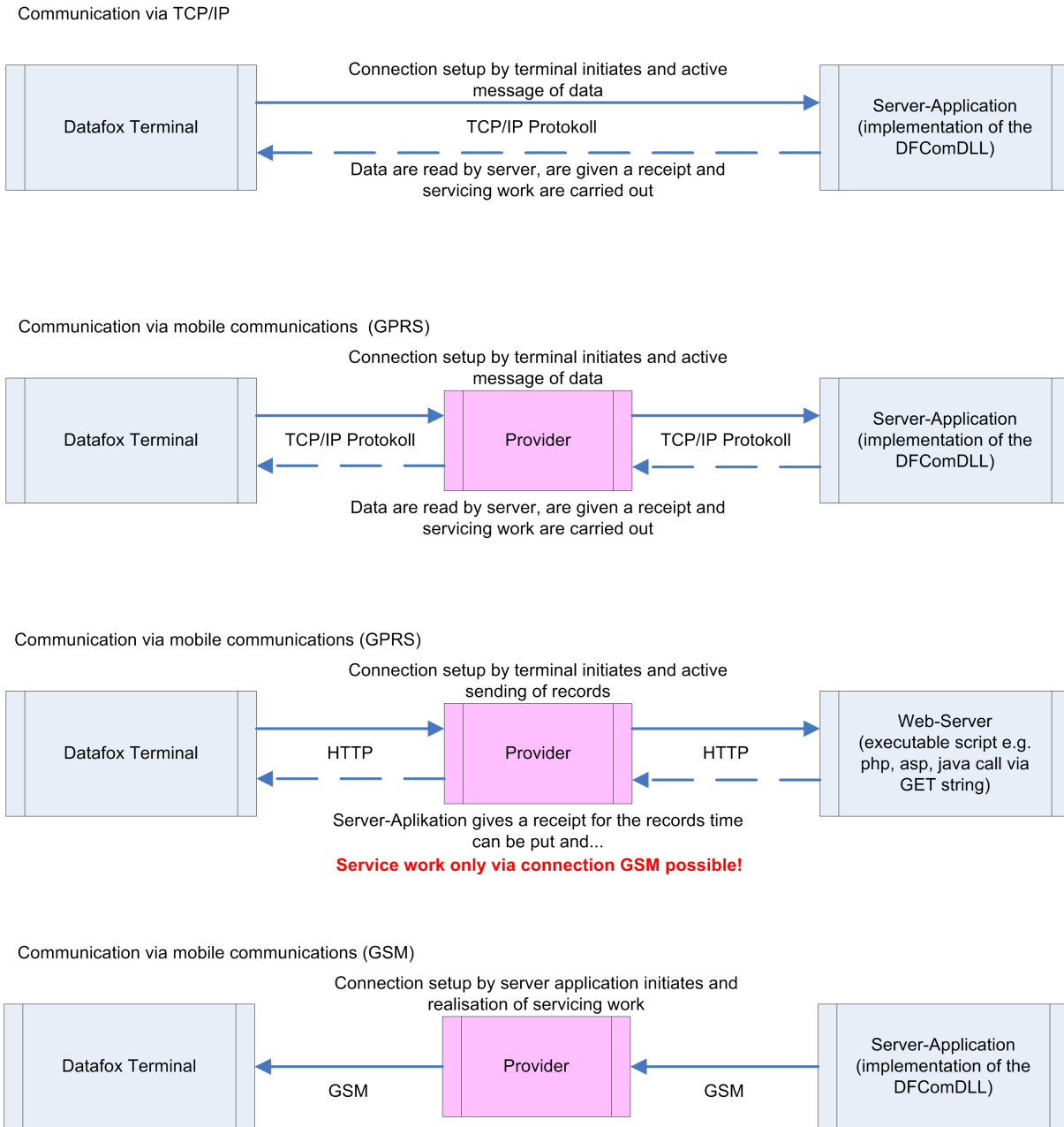
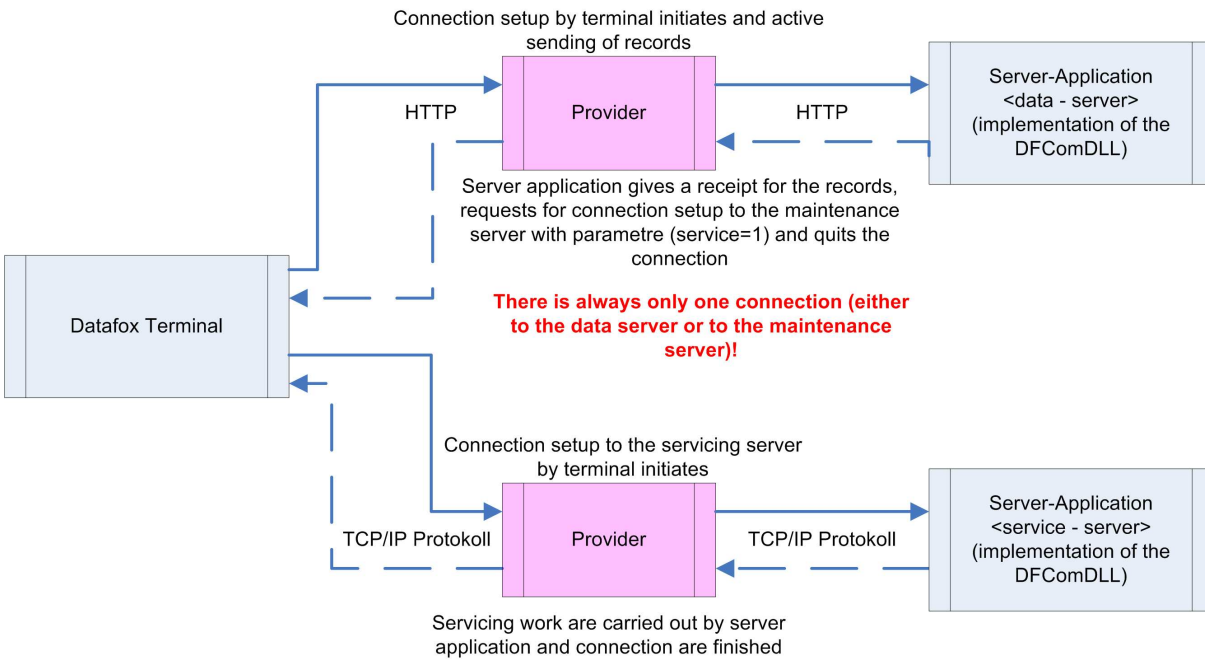


Figure 39:

Communication via mobile communications (GPRS)



3.6.9 WLAN

3.6.9.1 General information

There are two possibilities to configure the match port. Either via the TCP/IP with the DeviceInstaller™ of Lantronix® or via the RS232 using the tool WLANConfig and the DatafoxStudio (from version 04.01.06.xx on).

3.6.9.2 Terms and explanations

3.6.9.2.1 Infrastructure Mode

(Loose translation of an excerpt from the German version Wikipedia, the free encyclopaedia)

The Infrastructure mode is similar to the structure of the mobile communications network: A special base station (Access Point) is used to coordinate the other network nodes (Clients). The base station sends small data packets (so called Beacons) in adjustable intervals (ten times per second by default) to all stations being in the footprint. The beacons contain among others the following information: Network name ("Service Set identifier", SSID), List of supported transfer rates, Type of encryption.

This beacons ease the connection establishment, because the clients just have to know the network name and optional some parameters for the encryption. The permanent sending of beacon-packets also allows a control of the reception quality - also when no user data are sent or received. The beacons are always sent with the lowest transfer rate (1 MBit/s), the successful reception of the beacons does not guarantee a steady connection to the network.

3.6.9.2.2 Ad-hoc Mode

(Loose translation of an excerpt from the German version Wikipedia, the free encyclopaedia)

In the Ad-hoc mode (lat.: "created for this moment") no station is favoured; they all are on a par. Ad-hoc networks can be established quickly and without great effort. But for a spontaneous networking of a few terminals other techniques (Bluetooth, Infrared) are commonly used.

The preconditions for using the Ad-hoc mode are the same as for the Infrastructure mode: All stations use the same network name ("Service Set Identifier", SSID) and optionally also the same settings for the encryption. Because there is no central instance for this operating mode and because no beacon-packets are sent, a client cannot determine, whether there are other stations (using the same settings) within reach, who is part of the network or how good the connection quality is. Therefore, the Ad-hoc mode is suitable only for a small number of stations, that have to be close to each other because of the limited reach of the transmitter. Otherwise, it is possible, that a station cannot communicate with the other stations, because they simply do not receive a signal.

Forwarding data packets between the stations is not intended and not possible without further ado in practice, because in the Ad-hoc mode no information are exchanged, that might give the single stations an overview over the network. Gathering and exchanging these information is part of the upgrading of an Ad-hoc network to a mobile Ad-hoc network: Software components on each stations collect data (e.g. for visibility of other stations, connection quality etc.), exchange them among each other and make decisions concerning the forwarding of the user data. The development in this field is not finished yet. By now

a long list of experimental protocols (OLSR, MIT RoofNet, B.A.T.M.A.N etc.) and several proposals for standardisation (Hybrid Wireless Mesh Protocol, 802.11s) as well as some commercial solutions (e.g. Adaptive Wireless Path Protocol from Cisco) were produced.

3.6.9.2.3 Frequencies and ports

Channel Number	Frequency (GHz)	Permit in	Channel Number	Frequency (GHz)	Permit in
1	2,412	Europa, USA, Japan	8	2,447	Europa, USA, Japan
2	2,417	Europa, USA, Japan	9	2,452	Europa, USA, Japan
3	2,422	Europa, USA, Japan	10	2,457	Europa, USA, Japan
4	2,427	Europa, USA, Japan	11	2,462	Europa, USA, Japan
5	2,432	Europa, USA, Japan	12	2,467	Europa, Japan
6	2,437	Europa, USA, Japan	13	2,472	Europa, Japan
7	2,442	Europa, USA, Japan	14	2,484	Japan

Table 6: Frequencies and ports

3.6.9.2.4 Security and encryption

(Loose translation of an excerpt from the German version Wikipedia, the free encyclopaedia)

Part of the WLAN standard IEEE 802.11 is the Wired Equivalent Privacy (WEP), a security standard containing the RC4 algorithm. The contained encryption, with a static key of a length of just 40 bits (called 64 bits) or 104 bits (called 128 bits), sometimes also 232 bits (called 256 bits), does not guarantee, that the WLAN is secured sufficiently. By collecting pairs of keys Known-Plaintext-Attacks may happen. There are freely available programs, that are able to decrypt the password (a fast computer assumed), sometimes even without a complete packet cycle. Furthermore, each user of the network can read along the whole communication. The combination of RC4 and CRC is considered to be cryptographic insecure.

Therefore, technical complements were developed (e.g. WEPplus, Wi-Fi Protected Access (WPA) as advance and subset of 802.11i, Fast Packet Keying, Extensible Authentication Protocol (EAP), Kerberos or High Security Solution, that reduce the insecurity of WLAN more or less effective.

Child of the WEP is the new security standard 802.11i. It offers an increased security by using the TKIP (Temporal Key Integrity Protocol) for WPA or the AES (Advanced Encryption Standard) for WPA2. At the moment, it is regarded to be non-decipherable, as long as no trivial passwords are used, that can be decrypted via a dictionary-attack. It is recommended to create the passwords with a password generator, that contain special, numeric and alphabetical characters (upper and lower case) and have a minimum length of 32 characters.

CCMP (= Counter Mode with Cipher Block Chaining Message Authentication Code Protocol) or also Counter-Mode/CBC-Mac Protocol is, according to IEEE 802.11i, a cryptography algorithm. CCMP is based on the Advanced Encryption Standard (AES) and uses a 128-bit-key with a 48-bit-initialisator for answer query.

3.6.9.2.5 Authentication

(Loose translation of an excerpt from the German version Wikipedia, the free encyclopaedia)

Extensible authentication Protocol is a protocol for authenticating clients. It can access to the RADIUS server for user administration. EAP is mainly used for large WLAN installations within WPA.

Encryption systems, that require, that both members know the keys before communicating (= symmetric systems), are called Pre-Shared Key (PSK). An advantage of the PSK encryption is, that it can be realized more easily between two known members than asymmetric encryption. The major disadvantage of this system is, that the two members have to exchange the key in private before the communication takes place. Therefore, the PSK system is not suitable for many applications in the internet (e.g. online shopping), because there the prior exchange of a key is impossible or far too extensive. In such a case it is easier to use the Public-Key system.

3.6.9.2.6 Passwords

(Loose translation of an excerpt from the German version Wikipedia, the free encyclopaedia)

Modern encryption system are technical advanced insofar as they often can only be decrypted via dictionary attacks (except from trying all possible keys = Brute-Force method). At both attacks the weak point is the password (key), set by the user. In order to create a password, that is not less insecure than the actual encryption (112 to 128-bit-key for current systems), theoretically a sequence of about 20 random characters is necessary. If no random characters are used, considerable longer passwords are necessary in order to guarantee the same security level.

The length of passwords, that can be used for encryption, is often limited by the software (e.g. using AES passwords with more than 32 characters do not increase the security). Therefore, you should always use combinations of characters, that consist of rare words or word orders, fantasy or foreign-language words, initial letters of a sentence, numeric and/ or special characters or even combinations thereof. Its components should be unforeseeable for an attacker, who is well-informed about the person and his/her interests. As alternative you can use a password generator and fix the password in you memory or you note it on a secret place.

A relatively secure password could be: 0aJ/4%(hGs\$df"Y! (16 characters). The major problem of such sequences using random characters is, that they are difficult to be kept in mind and therefore have to be noted somewhere. A simpler alternative is, to use a rehearsed sentence and to change some characters, e.g. "dIE bANANNE*3 durch 1/4 nIKOTIN" (32 characters). It is very important to work in enough random characters. Suitable is the use of the initial letters of a sentence, e.g. "LS-Wbt7m/Ia1000tftY", created with the initial letters of the sentence "Little Snow-White beyond the 7 mountains/ Is a 1000 times fairer than You".

Although the use of special characters can increase the security, because the password becomes more complicated, you should use them carefully, if there is the possibility, that the password has to be used in foreign countries: It might be possible, that some special characters do not exist on foreign keyboards.

3.6.9.3 BIOS dialogue of the BDE-MasterIV

3.6.9.3.1 BIOS dialogue up to version 04.01.04.xx

The BIOS dialogue of the MasterIV terminal with display is structured as follows.

Setting the MatchPort is possible on the menu item Communication. Here you can set under TCP/IP the IP-address, port, host bits, gateway, remote access and alive counter. The button Set default resets the

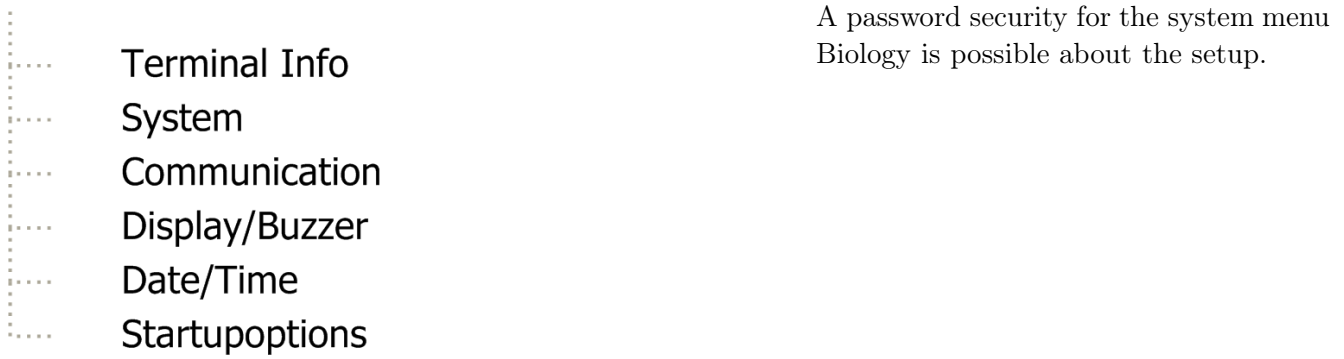


Figure 40: BIOS dialogue up to version 04.01.04.xx

basic settings of the MatchPort for the TCP/IP configuration (they can be set by the Lantronix device installer). The values of the IP-address, port etc. are not deleted. Under Factory default WLAN (from version 04.01.04.57 on) the defined WLAN settings (see point 2.4) are made.

3.6.9.3.2 BIOS dialogue up to version 04.01.05.xx

The BIOS dialogue of the MasterIV terminal with display is structured as follows.

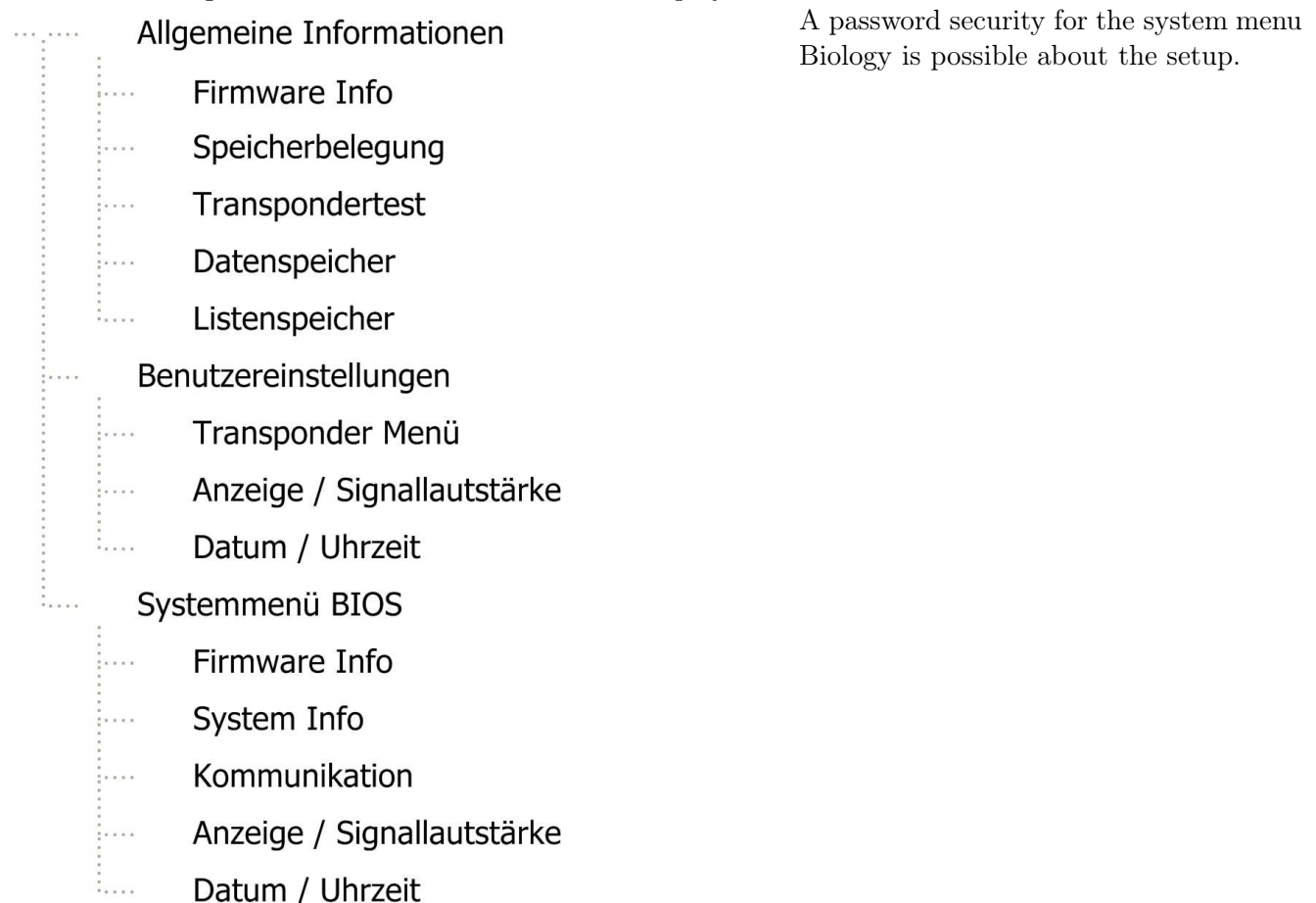


Figure 41: BIOS dialogue up to version 04.01.05.xx

Setting the MatchPort is possible on the menu item Communication. Here you can set under TCP/IP the IP-address, port, host bits, gateway, remote access and alive counter. The button Set default resets the basic settings of the MatchPort for the TCP/IP configuration (they can be set by the Lantronix device installer). The values of the IP-address, port etc. are not deleted. Under Factory default WLAN (from version 04.01.05.19 on) the defined WLAN settings (see point 2.4) are made.

3.6.9.3.3 The dialogue Communication and the TCP/IP settings

The current main communication can be selected under Communication. Depending on the device equipment also special settings of the communication modules can be made there. The Xport and the MatchPort by Lantronix have the same menu items for the TCP/IP configuration. WLAN settings for the MatchPort cannot be carried out via the BIOS dialogue. For this you have to use device installer by Lantronix or the program WLANConfig by Datafox. Reason for this division is, that configuring the WLAN parameters of the PZE-Master is very complex and complicated. If you use the settings, that were set by the device installer of Lantronix, and the device is not available via TCP/IP, you can reset the device to the default values in the BIOS dialogue (see 2.4).

3.6.9.3.4 Resetting the WLAN settings

On the terminal (from version 04.01.04.57 and 04.01.05.19 on) you can reset the device to firmly defined default values under Factory default WLAN of the menu item Communication of the BIOS dialogue. The following settings are made then.

WLAN: enabled Topology: Infrastructure Network name (SSID): WLAN-DATAFOX Security: none

The settings of your WLAN router have to be adjusted to the default values, so that you can work with the terminal again. In that case the module can be configured again with the device installer of Lantronix.

Another possibility is, to use the program WLANConfig by Datafox, which accesses to the device via RS232 and configures the MatchPort from there. An access to the MatchPort is always possible via RS232, provided that the main communication is set on RS232.

3.6.9.4 BIOS dialogue DatafoxStudioIV

In the BIOS dialogue of the Datafox Studio (< Communication => Device configuration BIOS >) you can make the same settings as directly on the terminal (except the restriction at TCP/IP Set default and Factory default WLAN, which is possible only at the terminal). You could compare the BIOS menu with a remote maintenance tool, but changing the settings is accessible only via RS232.

The setting of WLAN parameters is going to be available from version 04.01.06.xx in the Datafox Studio.

3.6.9.5 Dependencies

Because of the different methods for parameterisation, certain dependencies of several parameters arise.

3.6.9.6 WLAN configuration via the Lantronix tool

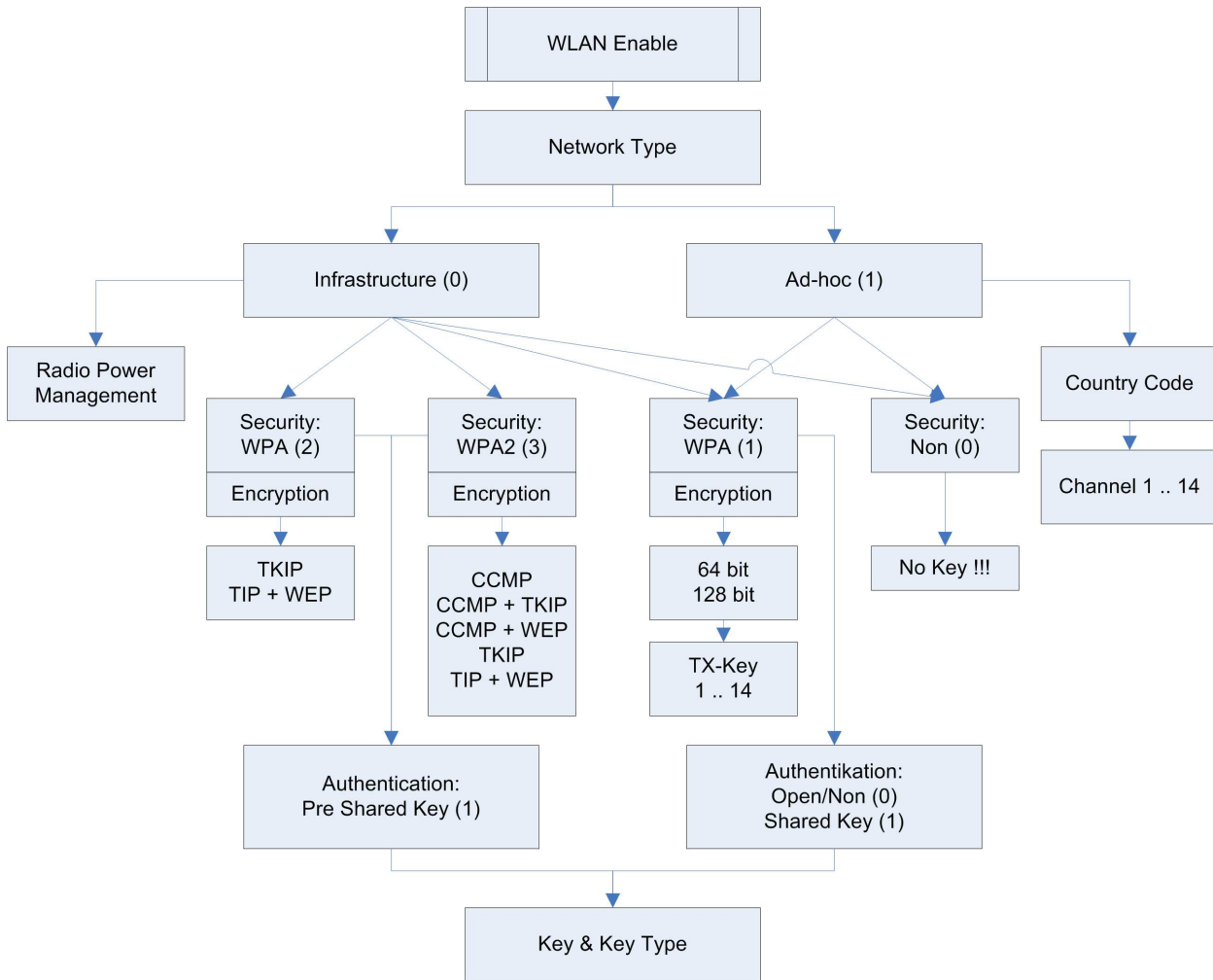


Figure 42: Dependencies

You may find the device installerTM of Lantronix® on the enclosed Datafox product DVD under DVD:
Datafox-Optionen (eingebaute Module)wLAN, Matchport.

With the help of this tool the COM servers Xport and MatchPort of the Datafox devices can be configured. The device installer accesses to the COM server via TCP/IP, the Datafox terminals via RS232. If a COM server is not available, because it is adjusted that much, so that the device installer is unable to access, it is possible to reset the COM server to the default values via the BIOS menu of the terminal.

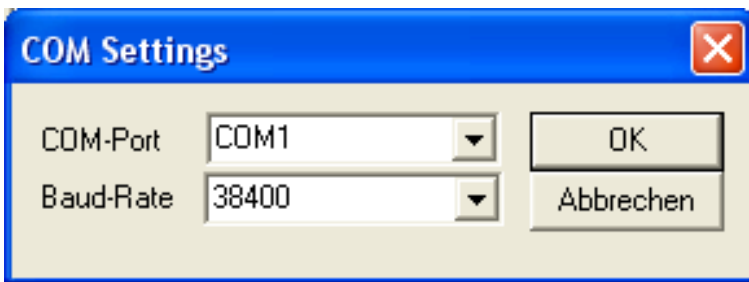
3.6.9.7 WLAN configuration via the DatafoxStudioIV

3.6.9.7.1 General

The program WLANConfig can set the TCP/IP and the WLAN settings of the MatchPort via RS232. These settings can be saved as a file and the data of this file can be transmitted to the device. The dependencies of the single parameters among each other are permitted or locked by the program automatically. Four dialogues are provided for working with the program.

- ▶ WLAN settings (main dialogue)
- ▶ Selection of the serial interface (COM settings)
- ▶ Selection of the configuration file (Select INI-File)
- ▶ TCP/IP settings (Terminal TCP/IP settings)

3.6.9.7.2 Selection of the serial interface



Via this dialogue you can select the interface of the PC, to which the MasterIV terminal is connected. Usually a baud rate of 38400baud is set, which has to correspond to that one of the terminal. You start the dialogue by pressing the button COM settings.

Figure 43: Selection of the serial interface

3.6.9.7.3 Selection of the configuration file

Via the button Select INI-File the dialogue is started. Here you can create new files or select a file, where data are logged on. On the INI file all settings of the TCP/IP and the WLAN are logged.

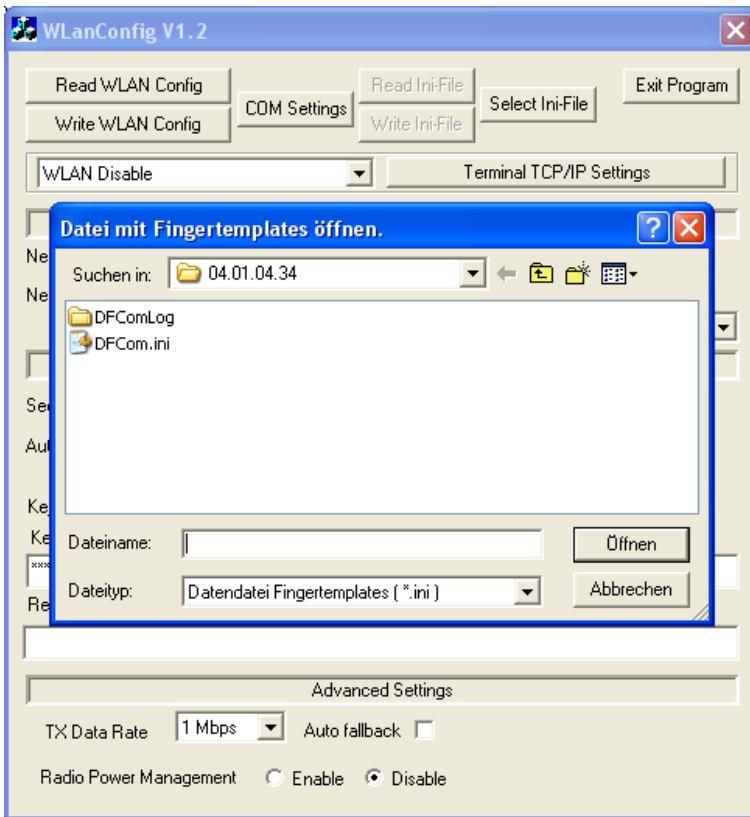
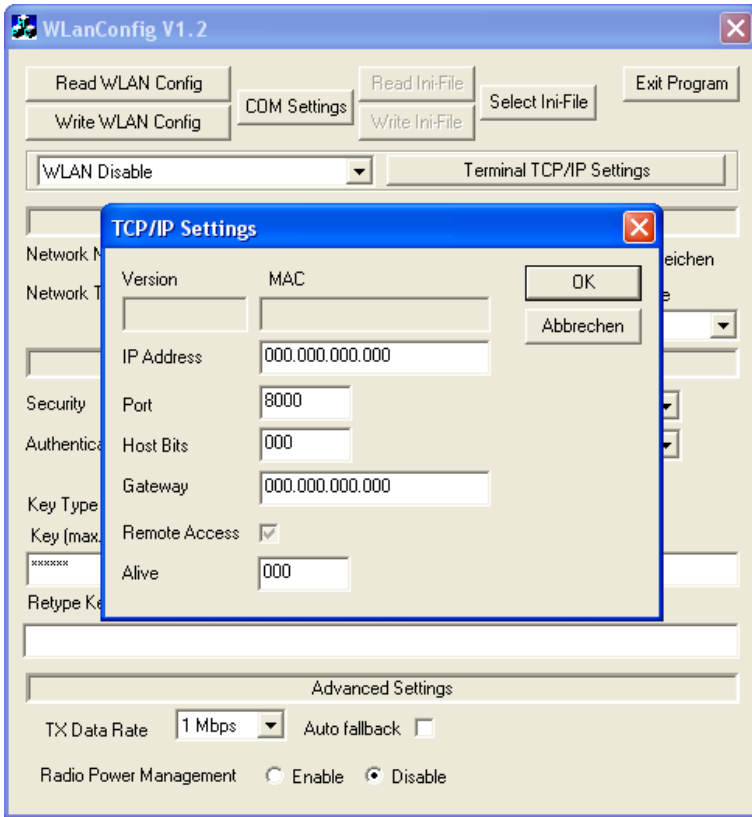


Figure 44: Selection of the configuration file

3.6.9.7.4 TCP/IP settings



Via the button Terminal TCP/IP Settings the dialogue is started. The current firmware version of the MatchPort and the MAC-address are displayed. You can edit the other parameters, which are equal to those of the BIOS dialogue of the terminal and of the Datafox Studio.

Figure 45: Selection of the configuration file

3.6.9.7.5 WLAN settings

The WLAN settings allow the editing of values, that were read out of the terminal and loaded in on a INI file or entered manually. It is very important, that the key cannot be read out of the terminal. It also cannot be re-recorded, if it was not entered. If the key is available in the INI file, a group of * characters is displayed on the key-edit fields after loading the data. It is also transmitted to the device then. In order to use WLAN you have to set WLAN Enable. This parameter can also be set by the device installer of Lantronix. If you want to configure several devices via WLANConfig, you have to note, that the IP-address of the devices has also to be set.

!

Caution:
After transmitting the parameters the device has to be set from RS232 to TCP/IP, so that the MatchPort is activated. Only then it is available in the network.

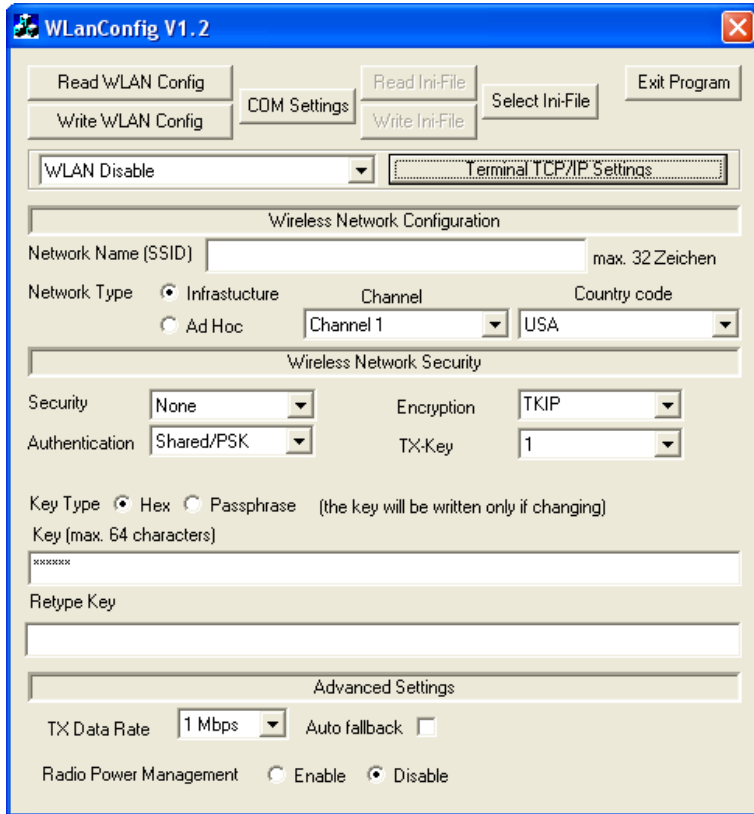


Figure 46: Selection of the configuration file

Via Read WLAN Config the data are loaded from the device to the program.

Via Write WLAN Config the data are loaded from the program into the device.

Via Read INI file the data are loaded from the selected file into the program.

Via Write INI file the data are written from the program in the file.

3.7 MMC as removable medium of the BDE-MasterIV

MMC stands for Multi Media Card. Multi Media Card.



Note:

The BDE-MasterIV can exchange data via a MMC. Before doing this you have to format the card with a FAT16-file system.

The card engages in the locking slot after displaying it (perceptible resistance). It can be unlocked and removed by pushing it again. Please be careful when displaying and removing the card. Thus, you increase the time of usage and avoid unnecessary trouble with repair and downtime.

There are two ways to use the MMC: manually or automatically. You can set how to use the MMC in the system menu (BIOS) in the sub menu < *communication* – > *interface* >. In this menu you can choose "MMC" as interface which means an automatic use. A condition for this is that a MMC has to be perceived by the firmware at least once before. If this is not the case, put the MMC into the device and restart it after shortly switching it to neutral.

3.7.1 Manual use of the MMC

In this operating mode the menu item "interface" is NOT set on MMC. The following procedure is necessary to exchange data with the MMC.

- 1.) plug in the MMC.
- 2.) Press the key combination ESC + F2 (red key, right key at the top) when the PZE Master is in the main menu. Thus you reach a MMC-menu where you have three choices.
 - a.) Data transmission to MMC.
 - b.) Data import from MMC. Please note that all lists have to be available. For more information about the directory structure see below.
 - c.) Data backup on MMC. This is a function that restores all possible data records from the ring buffer that is used in case of difficulties. Please note that this function is set back after loading a setup file (thus all data records are deleted).
- 3.) After carrying out the desired function leave the MMC-menu by pressing ESC.
- 4.) Remove the MMC.

3.7.2 Automatic use of the MMC

In this operating mode the menu item "interface" is set on MMC. The MMC is used automatically.

- 1.) Plug in the MMC. The device stops the control mode.
 - a.) Available data records are transmitted automatically to the MMC.

- b.) Lists are imported automatically from the MMC to the device. All lists drawn up in the setup have to be available.
- 2.) Remove the MMC.

3.7.3 Data structure on the MMC

In both cases the following directory structure is used and obligatory. Directory name, file name.

- **COMMON**
 - + **DATA**
 - SampleDS1.txt*
 - SampleDS2.txt*
 - + **LIST**
 - SampleListe1.txt*
 - SampleListe2.txt*
 - SampleListe3.txt*

The file names as SampleDS1 or SampleListe1 above (without the extension ".txt") are the names of the data record and list descriptions that you use in the setup. The folder names and the file extension ".txt" are preset and cannot be changed.

The folder "COMMON" is used as root directory.

It contains the sub-folder "DATA" in which the data records, that are assigned to each data record description (SampleDS1, SampleDS2), are filed with the file extension ".txt". Furthermore, it possibly contains the sub-folder "LIST" in which a file for each list description, that should be imported, is stored with the file extension ".txt". Only the lists that belong to the setup are imported (all lists have to be available), all others are ignored. Please note that the file name has to match the one in the setup and that the fields have to be separated from each other by a tab stop. Empty filed contents have to be given by a space.

Addition: The file names can comprise the possible 16 characters at most (default from AESetup) + the ".txt" - extension. The file name of a list has to match in upper and lower case. The extension ".txt" has to be lowercased. Directories and files that do not yet exist are created if necessary (e.g. COMMON/DATA/SampleDS1.txt). Data records are always added to existing files.

3.8 Access control II with TS TMR33 modules

The following hardware is available to construct an access control with TS TMR33 modules. The different options can be combined with each other according to the hardware requirements of the single devices.



BDE-MasterIV

The BDE-MasterIV supports the opening of up to 8 doors. The number was limited to 8 doors because the device has to carry out additional tasks for time and attendance parallel to the access control and the speed of the access control has nonetheless to be high.



Türmodul (TS TMR33-TM)

72 x 72 x 40 mm

The door module is offered as pure electronic component e.g. to build it in a patress box, or in a housing for surface mounting with alarm control panel.



Reader (TS TMR33-L)

80 x 80 x 25 mm

The reader can be ordered separately to connect it directly to a PC or another access check. A connecting diagram and a description of the commands for the activation are included.



Module set = reader + door opening function (TS TMR33-LTM)

80 x 80 x 25 mm

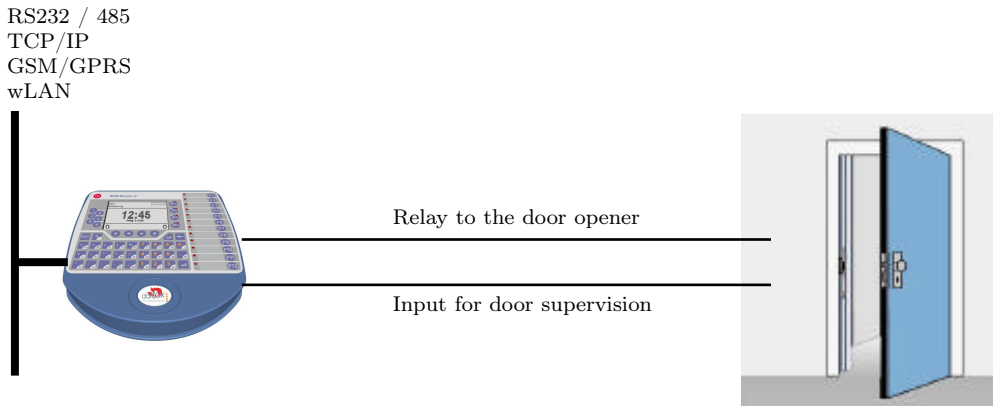
The module set can be ordered separately to connect it directly to a PC or another access check. A connecting diagram and a description of the commands for the activation are included.

3.8.1 Set-up

In the following chapters different possibilities to set the device up are explained. The BDE-MasterIV is used as reference device.

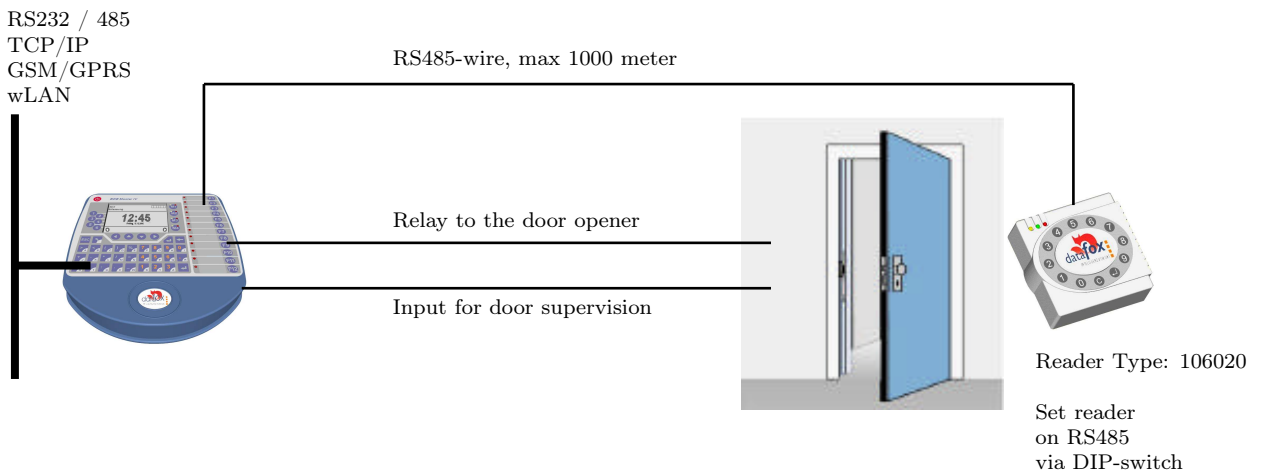
3.8.1.1 A door without a separate reader

The time recording terminal is access scanner, access master and door-opener at the same time. This solution should only be used in protected places so that the door opening relay cannot be manipulated.



3.8.1.2 A door with a separate reader

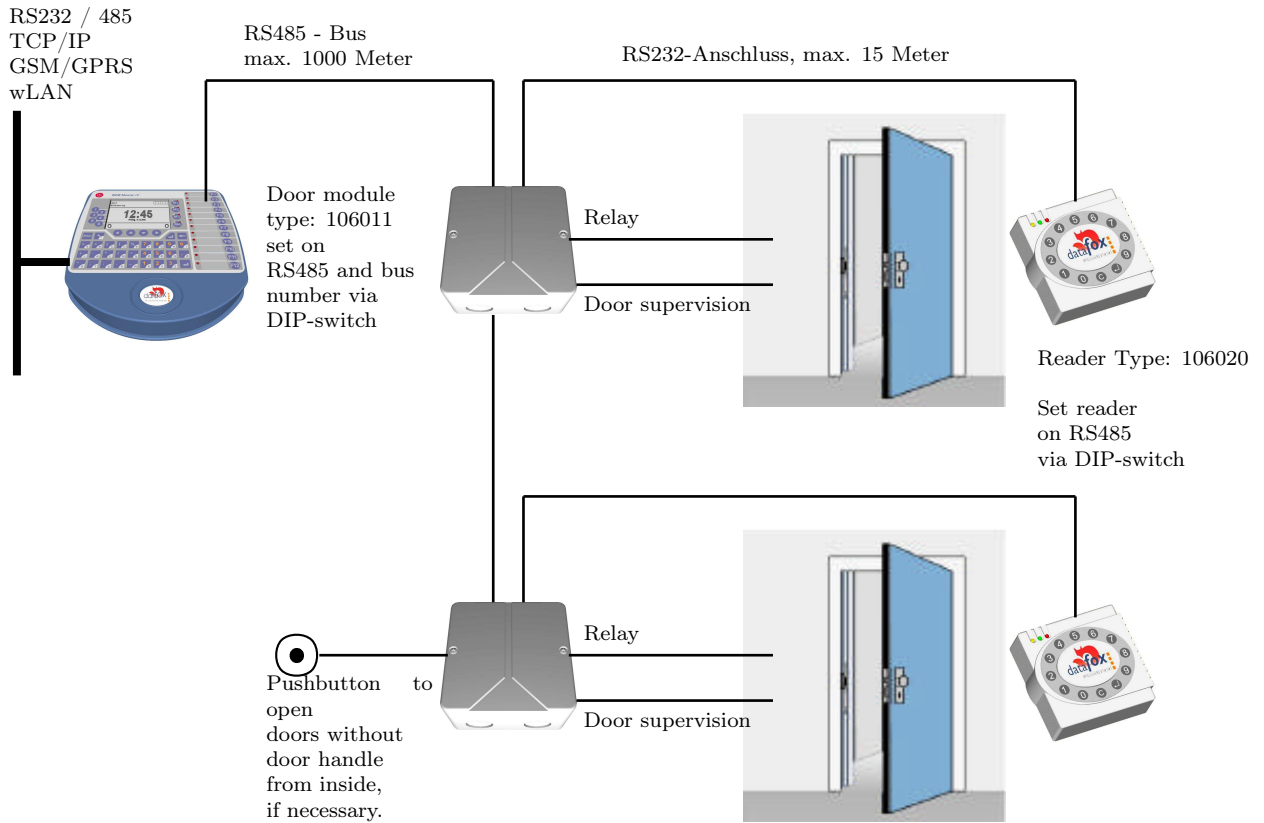
The BDE-MasterIV is installed in a protected area inside a building and the reader is installed outside. The terminal is access master and door-opener at the same time. The door opening relay is in the BDE-MasterIV and thus in the protected area. The access identification captured by the reader is transmitted to the BDE-MasterIV and analysed by it. If the access is permitted, the door is opened via the relay in the BDE-MasterIV.



This version is used frequently and can be installed easily and economically as shown in the figure above.

3.8.1.3 Several external doors via RS485 bus

Here a door module has to be used so that the door opening relay is in the protected area.



The door module permanently calls up the reader. If a transponder is read the information is transmitted from the reader to the door module. The BDE-MasterIV permanently polls to the door module. If a booking is available, it is collected immediately. If the access is permitted, the BDE-MasterIV sends a command to the door module to open the door.

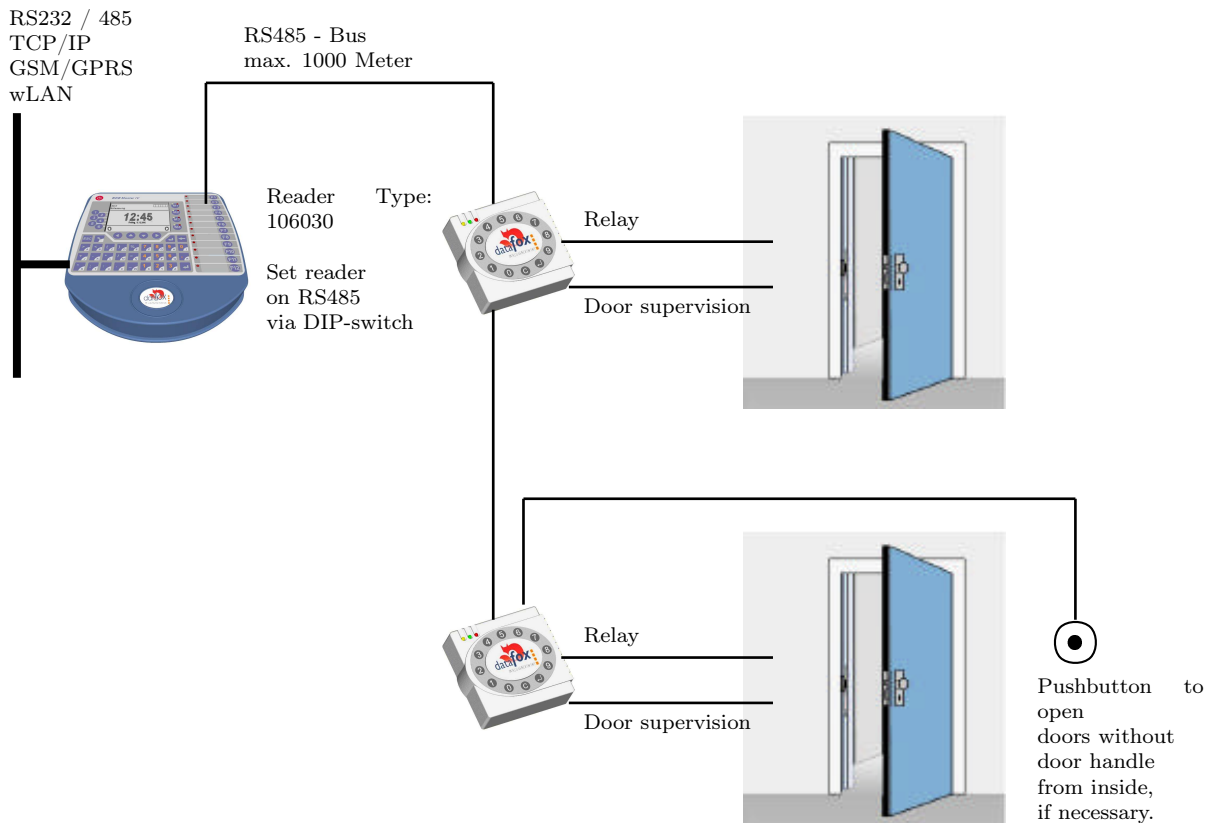


Note:

The relay in the BDE-MasterIV can be used here as well. See chapter 3.1, that means the terminal can replace the first door module. In order to use the appropriate reader in the RS485 bus, it has to be set on RS485 via the DIP switches at the backside of the reader.

3.8.1.4 Several internal doors via RS485 bus

The combined reader + door-module is used here. The door opening relay is included in the combined module. Watch out, this assembly must not be used at outdoor locations because then the relay is not in a protected area.



The BDE-MasterIV permanently polls to the door module. If a booking is available, it is collected immediately. If the access is permitted, the BDE-MasterIV sends a command to the door module to open the door.

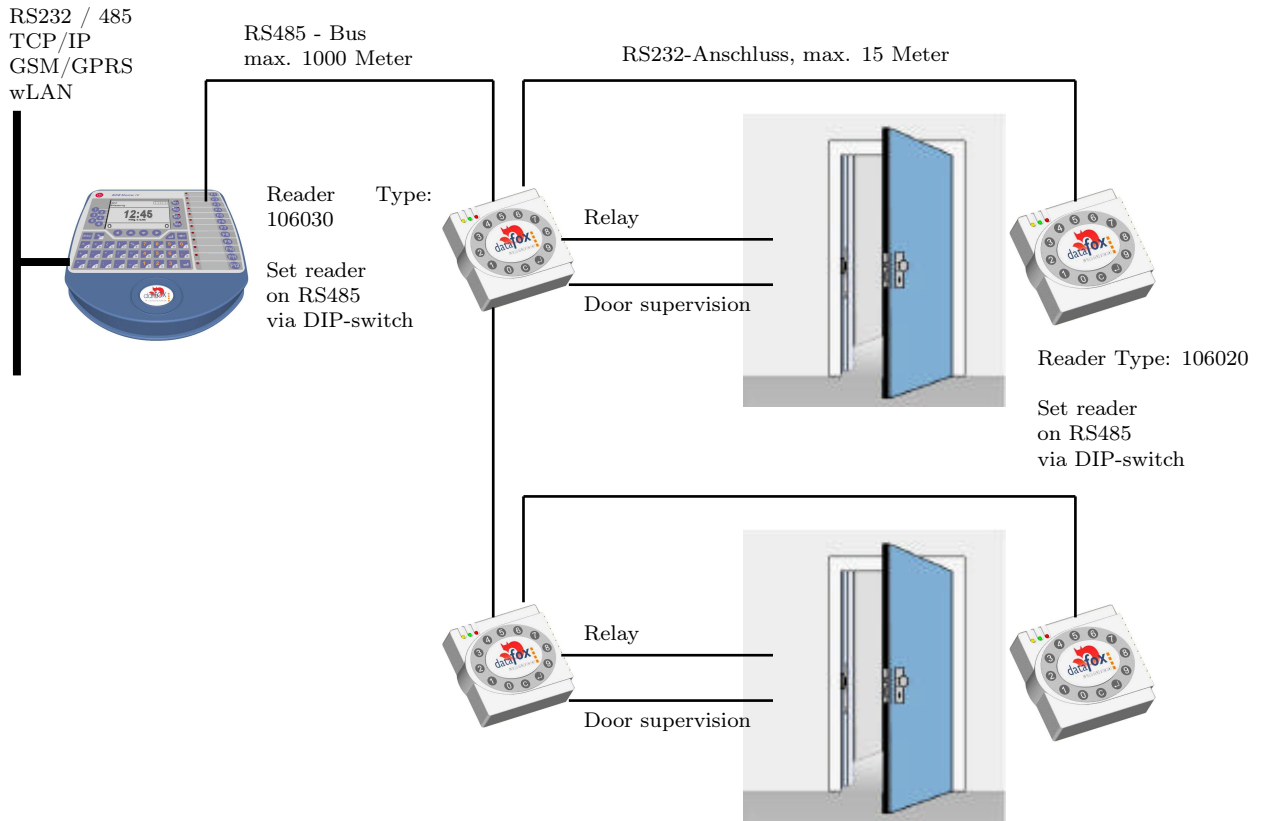


Note:

The relay in the BDE-MasterIV can be used here as well. See chapter 3.1, that means the terminal can replace the first door module. In order to use the appropriate reader in the RS485 bus, it has to be set on RS485 via the DIP switches at the backside of the reader.

3.8.1.5 Mantrap function with RS485 bus

The combined reader + door-module and the reader-module is used here.



The BDE-MasterIV permanently polls to the door module. If a booking is available, it is collected immediately. If the access is permitted, the BDE-MasterIV sends a command to the door module to open the door.



Note:

The relay in the BDE-MasterIV can be used here as well. See chapter 3.1, that means the terminal can replace the first door module. In order to use the appropriate reader in the RS485 bus, it has to be set on RS485 via the DIP switches at the backside of the reader.

3.8.2 Connection

The following figure shows the possibilities for connecting the TMR33 devices to a BDE-MasterIV for the access control. The TMR33 devices have to be set depending on the interface that is used (RS232 or RS485).

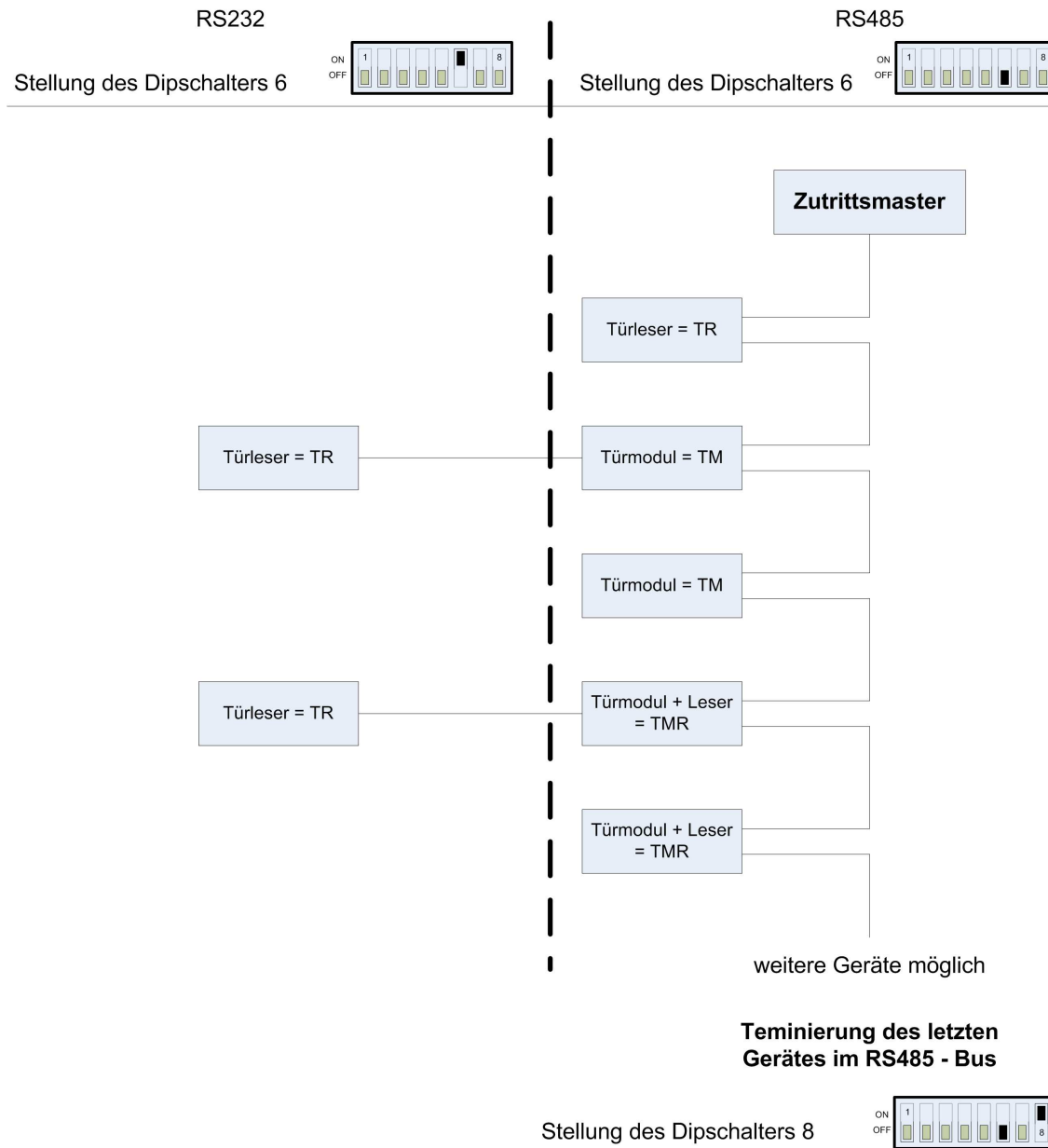


Figure 47: Connection of the access control II

The DIP switches 1 - 5 are for the bus configuration. Via them the bus number of the device is set. The DIP switch 1 in position "ON" and 2 - 5 in position "OFF" stand for bus no. "1". The DIP switches 1 and 2 in position "ON" and 3 - 5 in position "OFF" stand for bus no. "3".



Caution:

The installation and connection of the TMR33 module may only be carried out by a person qualified in this field. Avoid switching the connecting terminal (reverse polarity).

From this arise different possible combinations. The following figures show examples for the connection wiring.

3.8.2.1 Wiring

In most cases a shielded twisted pair cable is used as transmission medium for the assembling of a RS485 bus. It should be a twisted pair cable because that way the voltages induced by an electromagnetic field work opposite and thus offset each other.

In accordance with the specifications (TIA-EIA-485-A) the maximum cable length depends on the transmission rate.

Segmentlänge [m]	100	200	400	1000	1200
Datenrate [kBit/s]	12000	1500	500	187,5	9,6

Table 7: Cable length dependent from the data rate

Our recommendations for a data cable are the following types of cables: Li-YcY 2x2x0,5 mm², J-2YY 2x2x0,5 mm² oder J-Y(ST)Y 2x2x0,5 mm² (Cat5 shielded).



Caution:

When erecting an access control system, a calculation of the maximum cable length, the necessary cable cross-section and voltage supply has to be done in any case. See chapter 3.8.2.2 for further hints.

Example: Wiring for a door

An external access reader TS TMR33-L is connected directly to the terminal. The door opening is controlled via the relay integrated in the terminal. Further functions, e.g. supervision of the door (open or closed), can be realized via the digital inputs of the BDE-MasterIV.

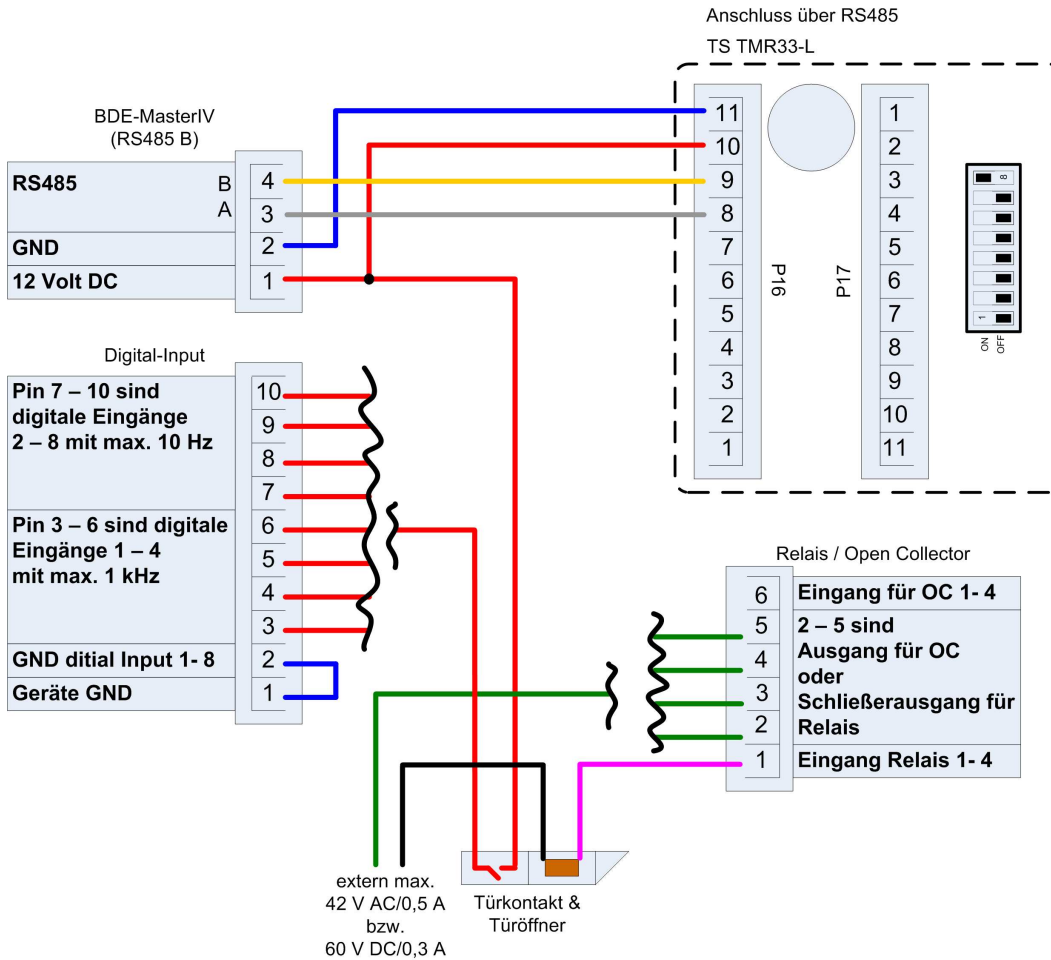


Figure 48: Wiring for a door

In einem solchen Fall ist die Reader-Tabelle (Zutrittskontrollliste) wie folgt zu konfigurieren:

ID	ZM	TM	RefLocation	RefAction	PinGeneral
1	1	320	0	1	0
2	1	000	0	1	0

Table 8: Reader table

ID = 1 identifies the data record for the BDE-MasterIV, that always gets the value 320 in the column TM (Türmodul/ door module). ID = 2 identifies the external reader (TS TMR33-L), that is connected to the BDE-MasterIV via RS485. The type of connection (RS485) is marked by the zero at this position 000 in the column TM.

Example: Wiring of a mantrap

A door is controlled via an internal door module with integrated reader TMR33-TMR and an external access reader TMR33-TR as mantrap. In this case the internal door module is connected to the BDE-MasterIV via a RS485 bus. The external access reader is connected to the internal door module with a RS232 stub. The door opening is controlled via the relay integrated in the door module TMR33-TMR. In this case the door module with the relay is in the secure area and the external access reader without a relay is in the insecure area.

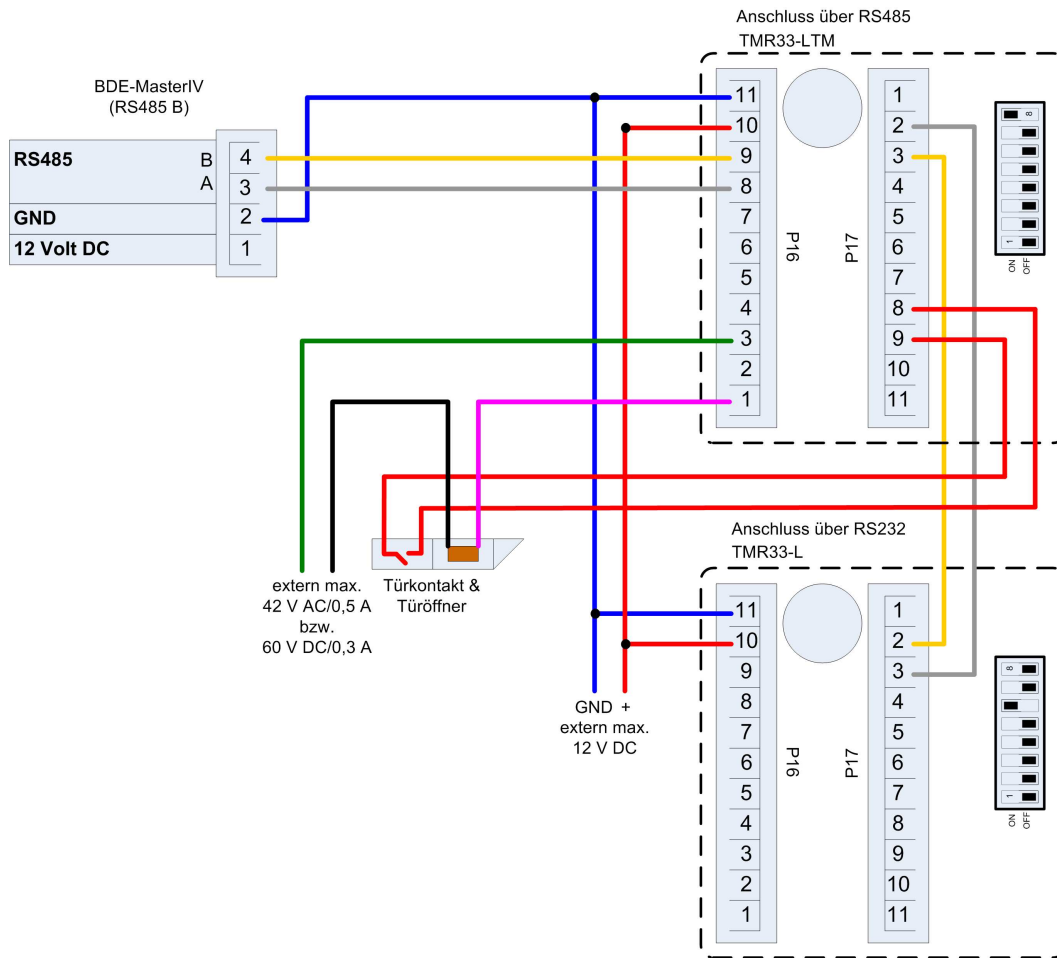


Figure 49: Wiring of a mantrap

Note:

- Connection for electricity supply via power supply unit or bell transformer. Please note the hints for the calculation of the cable cross-section and the cable length.
- Install the door-opener in the protected area when using it for exterior doors.
- At closed door contact approx. 15 mA are used up at 12 V = 0,18 Watt. This means a consumption of approx. 1,6 kWh per year.

Example: Controlling the door-opener only via the ZK-II

You can control the door-opener directly via the access control-II (ZK-II). Please note that the door-opener has to work in a voltage range from 8 to 12 V DC and must not exceed a power consumption of 100 mA.

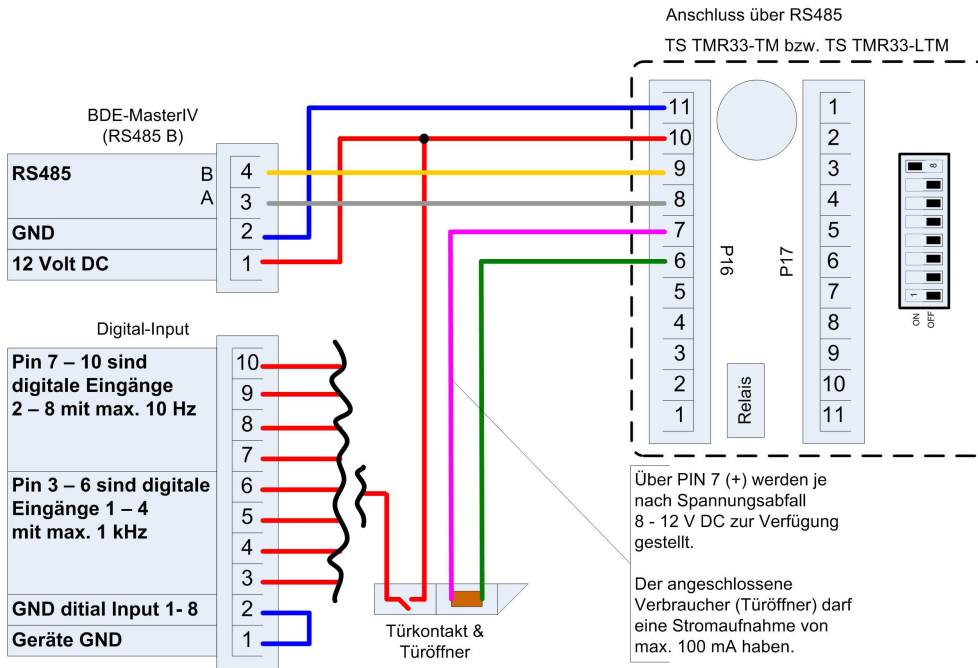


Figure 50: Controlling the door-opener only via the ZK-II

Example: Controlling the door-opener via the ZK-II and a push-button

It is possible to additionally connect a push-button for controlling the door-opener.

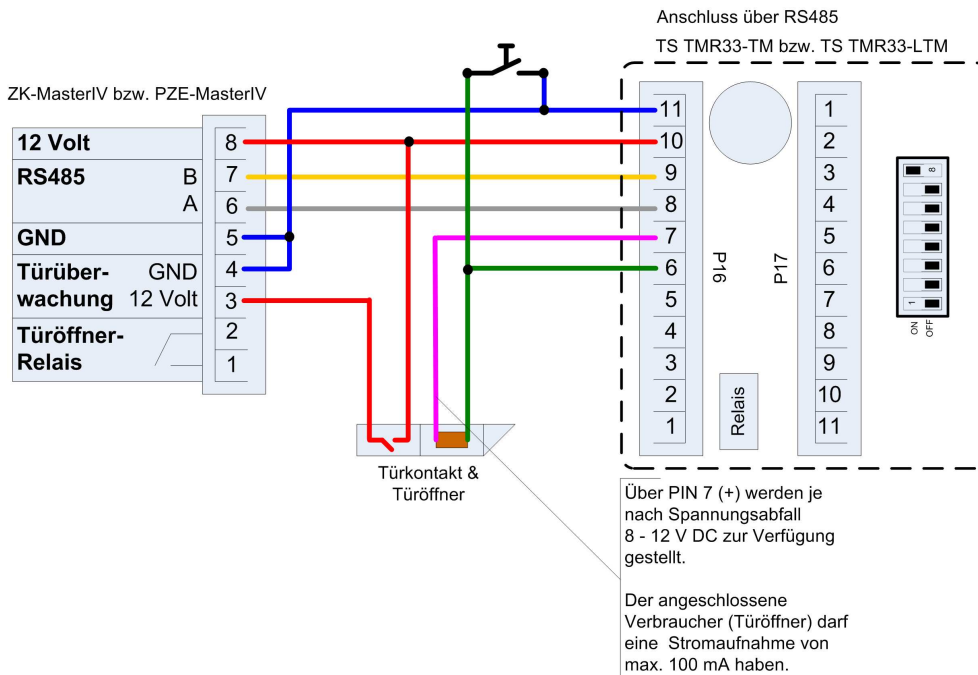


Figure 51: Controlling the door-opener via the ZK-II and a push-button

Example: Controlling the door-opener via the ZK-II, relay and push-button

You want to control the door-opener directly via the access control-II. You want to open the door without transponder via a push-button in a lobby with a view of the entrance area. Additionally, this push-button circuit should only be active at certain times. This scenario can be portrayed as follows:

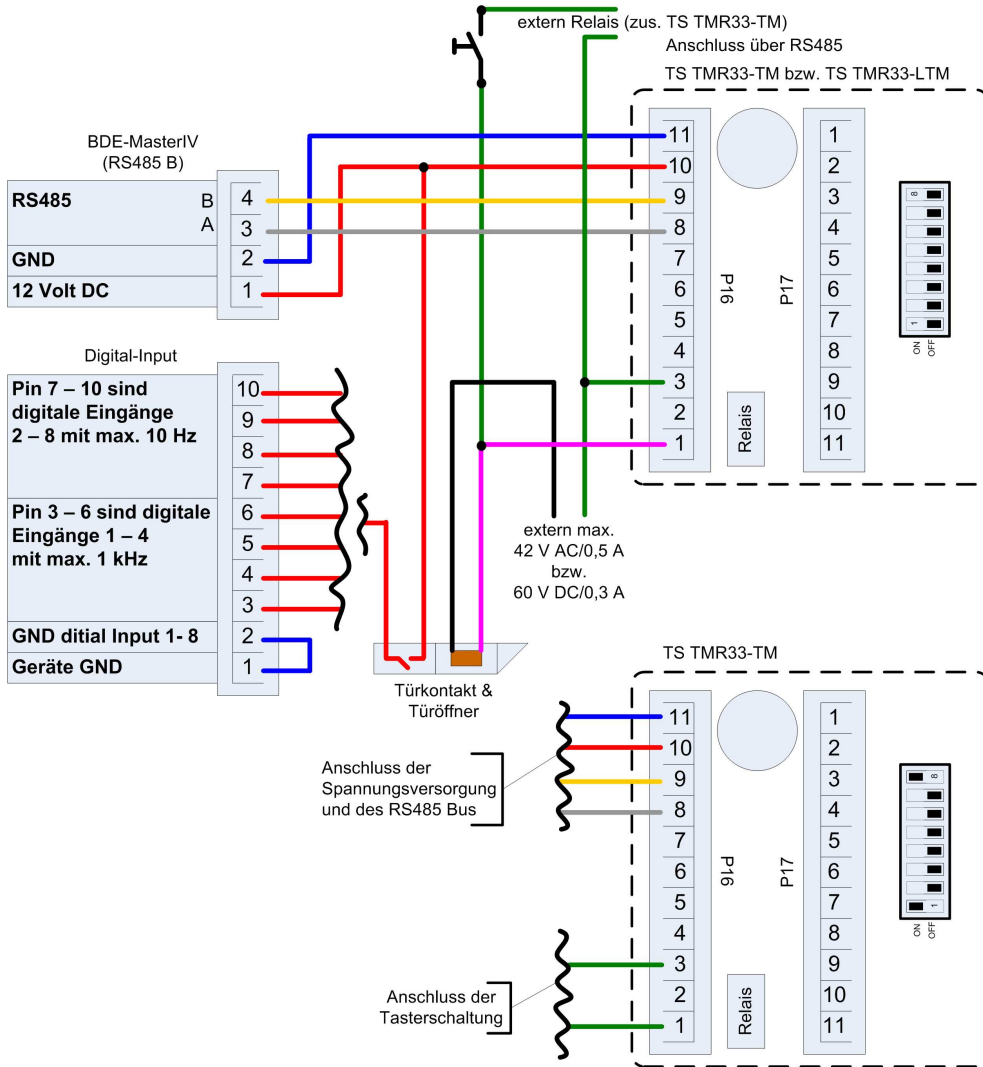
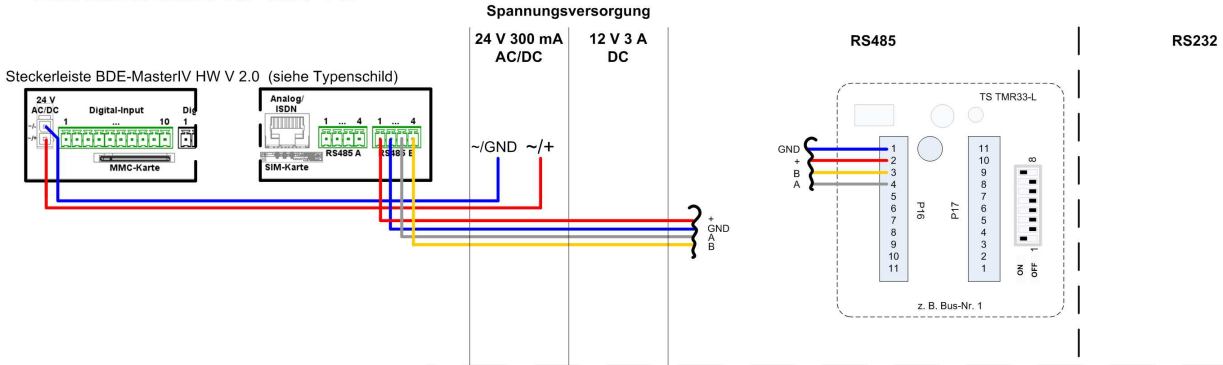


Figure 52: Controlling the door-opener via the ZK-II, relay and push-button

Initially, we use an external voltage source for the supply of the door-opener. It is controlled via the relay of the TS TMR33-TM, connection 1 and 3 of the strip terminal P16. The NC contact of the relay is bridged with the push-button. The activation of this push-button circuit is realized via an additional relay (TS TMR33-TM). You can configure the period of time of the activation at the access control lists in the ZK-II. For this you have to include the additional TS TMR33-TM module in the reader table. In the action table you set which output (relay) is switched on which module of the reader table. Set the elapse-value on 0. You define via the reference on a time model (RefTime) from when the relay switches (push-button circuit activated) and when the relay drops out again.

Zutrittskontrolle für eine Tür



Zutrittskontrolle für mehrere Türen

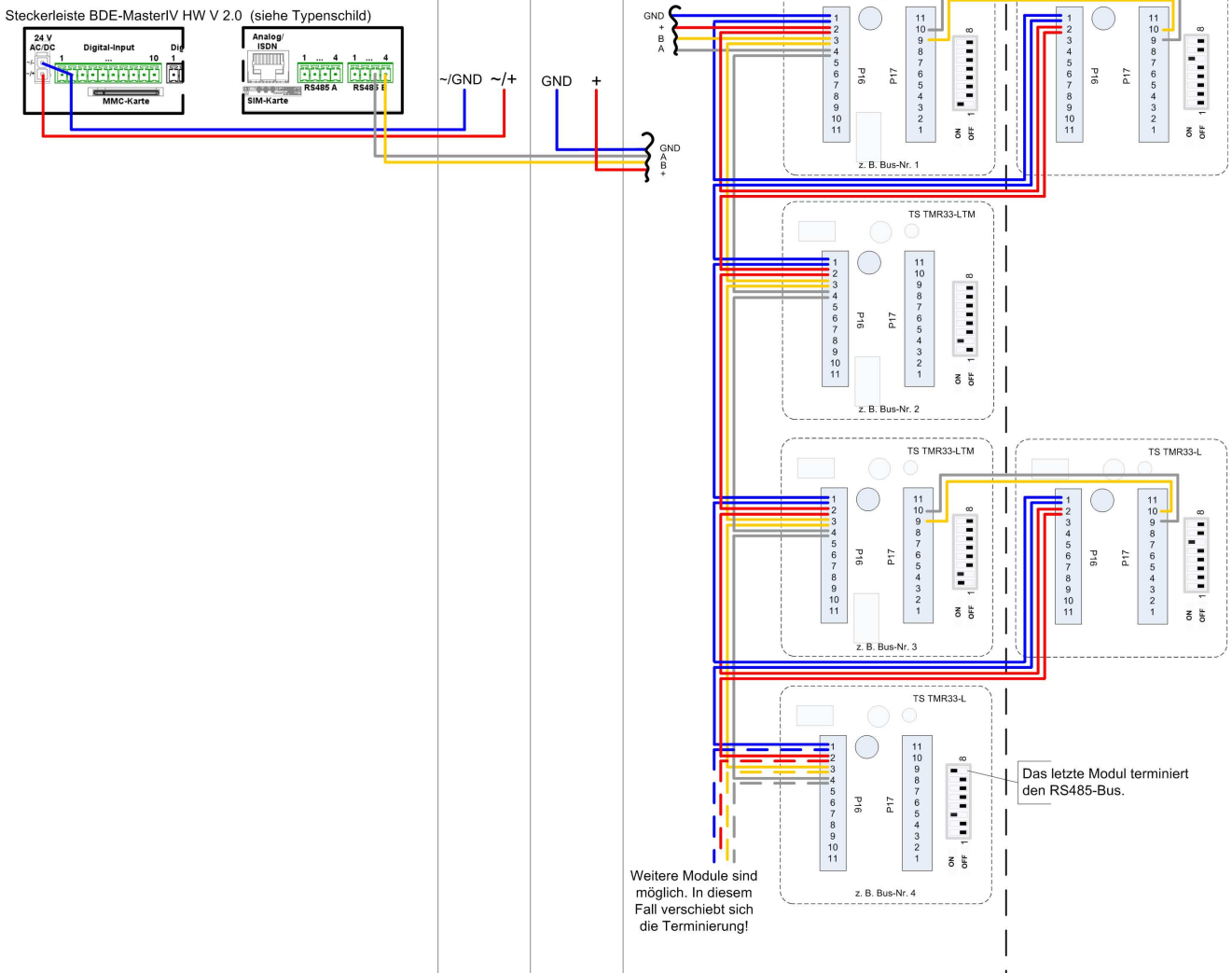


Figure 53: Wiring scheme

3.8.2.2 Calculation instructions

When using Datafox access readers or door modules, the necessary cable cross-section has to be calculated before setting up a RS485 network for the access control. The voltage drop in the whole bus must not be higher than 4 V. Please note that if you use a Datafox device power supply unit as voltage source, 16 modules at most (8 in the RS485 bus and 8 via RS232 stub line) can be fed.

Maximum power consumption of the single modules:

TS-TMR33-TR	56,5 mA
TS-TMR33-TM	156,0 mA
TS-TMR33-TMR	180,0 mA

The result of it is a permissible maximum power consumption per Datafox device power supply unit of (8 x 180,0 mA + 8 x 56,5 mA) 1,9 ampere. In order to assure this, you can calculate the necessary cross-section for a given cable length or the permissible maximum cable length for a given cable cross-section.



Caution:

Before a setting up and commissioning of a ZK-network, in any case the calculation has to be done by a person qualified in this field.

The cable cross-section is calculated as follows:

$$q = \frac{2 * I * l}{\kappa * U_v}$$

q = Cable cross-section in mm^2

I = Current in A

l = Cable length in m

κ = Conductivity (kappa) for Cu-conductor = $56 \frac{m}{\Omega * mm^2}$

U_v = Voltage drop 4 V at most

Thus the developed equation for calculating the maximum cable length for a given cable cross-section is:

$$l = \frac{q * \kappa * U_v}{2 * I}$$

3.8.2.3 Topologie

If a bus topology is used when setting up the network, you have to calculate the cable cross-section for each bus segment with regard to the maximum power consumption of the respective segment (see figure 54).

At a star cabling the cable cross-section for each cable has to be calculated with regard to of the power consumption of the respective module.

Note:

Because this document only deals with the voltage supply of an access control system, the depiction of the RS485 data bus is abandoned in the figures. The voltage supply is simply depicted as one line. Additionally, the cable length that has to be calculated is marked by a broken line.

3.8.2.4 Examples

3.8.2.4.1 Bus topology

We take as a basis that the longest distance from the voltage source to the last module is 65 m.

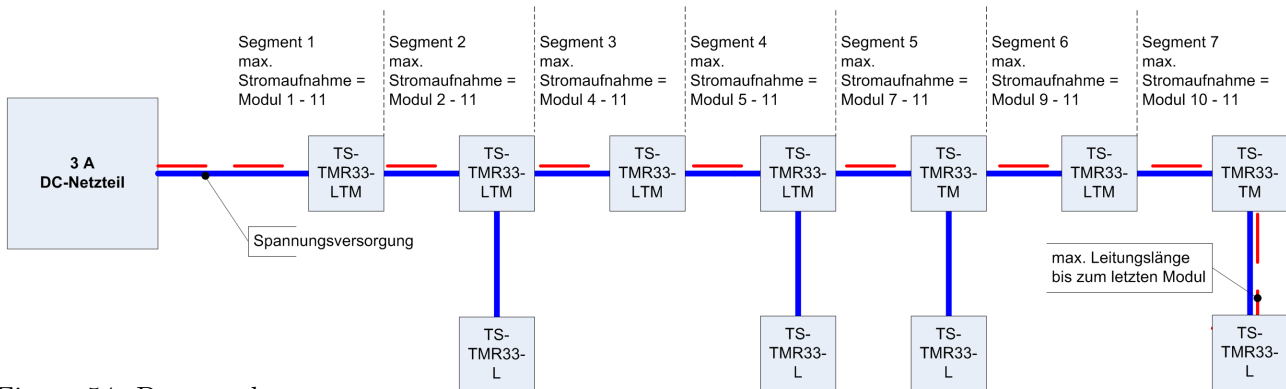


Figure 54: Bus topology

In order to assure a high safeguarding and to keep the calculation simple, you can take the following steps. Calculate the power consumption of all modules connected to a voltage source (max. 16 modules) and take the longest distance from the voltage source to the last module. If the result of this simplified method of calculation for the cable cross-section is a value higher than $1,5 \text{ mm}^2$, you have to use additional power supply units and recalculate the system. By this additional power supply unit you can compensate the voltage drop at a smaller cable cross-section by a shorter cable length (two sub-networks with regard to the voltage supply not with regard to the RS485 data bus). The calculation of the total power consumption for the example in figure 54 is as follows.

$$I = (4 * 56,5 \text{ mA}) + (2 * 156,0 \text{ mA}) + (5 * 180,0 \text{ mA}) = 1.438 \text{ mA} = 1,438 \text{ A}$$

Now we put the values in the equation and get the necessary cable cross-section:

$$q = \frac{2 * 1,438A * 65m}{56 \frac{m}{\Omega * mm^2} * 4V} = \frac{2 * 1,438A * 65m * V * mm^2}{56m * 4V * A}$$

$$q = 0,83mm^2$$

If we take as a basis that the bus has a maximum length of 200 m, the result of the calculation will be a cable cross-section of 2,6 mm². That means we would need an additional power supply unit.

3.8.2.4.2 Star topology

In this example the maximum cable length for each cable is calculated separately for a given cable cross-section. We take a cable cross-section of 0,75mm² as a basis. The length of each cable has to be calculated separately.

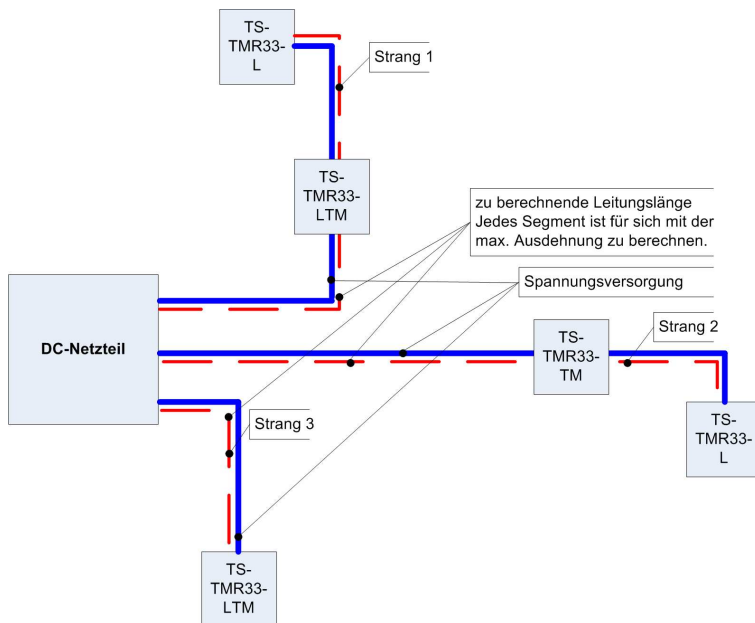


Figure 55: Star topology

cable 1:

$$I = 1x180,0mA + 1x56,5mA$$

$$I = 236,5mA$$

$$I = 0,2365A$$

The result for the maximum cable length for cable 1 is:

$$l = \frac{0,75mm^2 * 56 \frac{m}{\Omega * mm^2} * 4V}{2 * 0,2365A} = \frac{0,75mm^2 * 56m * 4V * A}{2 * 0,2365A * V * mm^2}$$

$$l = 355,2m$$

cable 2:

$$I = 1x156,0mA + 1x56,5mA$$

$$I = 212,5mA$$

$$I = 0,2125A$$

The result for the maximum cable length for cable 2 is:

$$l = \frac{0,75mm^2 * 56 \frac{m}{\Omega * mm^2} * 4V}{2 * 0,2125A} = \frac{0,75mm^2 * 56m * 4V * A}{2 * 0,2125A * V * mm^2}$$

$$l = 395,3m$$

cable 3:

$$I = 180,0mA$$

$$I = 0,18A$$

The result for the maximum cable length for cable 3 is:

$$l = \frac{0,75mm^2 * 56 \frac{m}{\Omega * mm^2} * 4V}{2 * 0,18A} = \frac{0,75mm^2 * 56m * 4V * A}{2 * 0,18A * V * mm^2}$$

$$l = 466,7m$$

**Note:**

The total power consumption has to be calculated for each cable.

3.8.3 Configuration

The basis of the access control II are tables. They store all information about the hardware configuration of the access control system, access right of the staff, periods of time (activation, blocking times, holidays,...). There is the following connection between the tables:

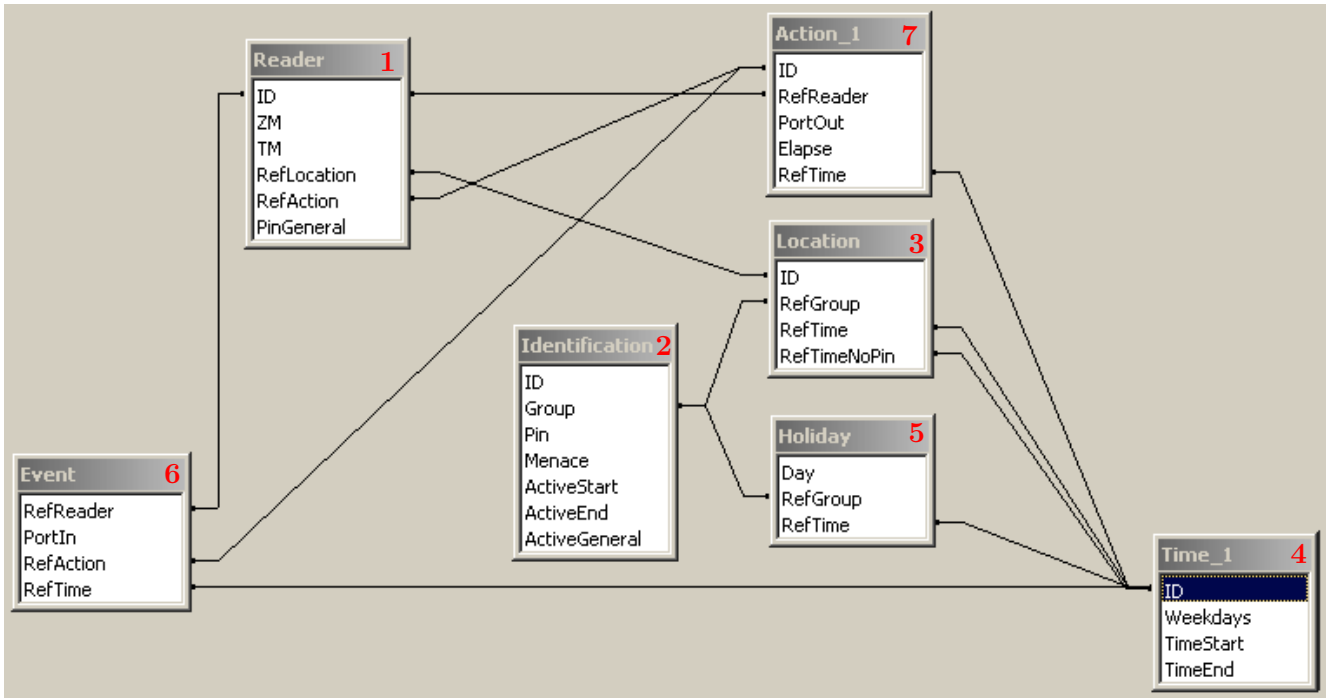


Figure 56: Data structure of the access control II

The tables are created as text files. For an easier administration you can add comments within the files.

When adding comments you have to notice that in a comment line no field values can be given and that the comment line has to start with a semicolon.

A Reader.txt (Reader table) could look as follows:

```
; Reader list for the test access control system
; ID ZM TM RefLocation RefAction PinGeneral
1 1 320 1 1 0
2 1 010 1 1 0
```

Please gather a close description of the table structure, indication of the data types and field length from the following tables.

Alias	Data type	Length	Description
ID	Number (int)	4	Unique Key (<i>Wert</i> > 0) of the Reader table.
ZM	Number (int)	4	It has in our example number 1. If there are several PZE-MasterIV in an access system, they can be depicted in one table connection and it is not necessary to have a separate string for each PZE-MasterIV.
TM	Number (int)	3	Contains two information in one number. Both figures on the left (010) indicate the bus number of the door module, the figure on the right (010) contains information about the type of connection. A 0 means a connection via RS485, a 1 stands for a connection via RS232 as stub.
RefLocation	Number (int)	4	Indicates which room is supervised by the reader.
RefAction	Number (int)	4	Indicates which action is worked through after a successful check.
PinGeneral	Number (int)	8	Can contain a numerical sequence via which a person without a card gets access.

Table 9: Reader table (list of all devices installed in the system - master and door modules)

Alias	Data type	Length	Description
ID	String (ASCII)	20	Contains the card no. which is read at the TMR33 device or terminal. A card can occur several times (is assigned to several authority groups).
Group	Number (int)	4	Assigns the card to an authority group.
Pin	Number (int)	8	Activates a PIN query if not equal 0. Please note that a PIN must not start with a zero. 0815 would be invalid.
Menace	Number (int)	4	Activates (if not equal 0) a "menace-PIN" that can be added to the PIN. If entered, the system sends a data record that can be analysed by software developed for this purpose and sets off the alarm.
ActiveStart	String (Date)	10	The tag entered here indicates the beginning of validity of the card.
ActiveEnd	String (Date)	10	The tag entered here indicates the end of validity of the card (e.g. 2007-07-12 = yyyy-mm-dd).
ActiveGeneral	Number (int)	1	Activates or deactivates this card record. 0 = card blocked 1 = card active 2= virtual card (use only via DLL) 3 = access only by entering the PIN 9 = general authority (no PIN query)

Table 10: Identification table (list of all cards known by the system))

Alias	Data type	Length	Description
ID	Number (int)	4	ID of the room. All other tables refer to this data line via this number, if necessary.
RefGroup	Number (int)	4	Reference to the identification table. Labels the access authorized group. All cards of this group have access to this room.
RefTime	Number (int)	4	The time model in which authorized persons get access. (0 = not used)
RefTimeNoPin	Number (int)	4	The time model to which an additional PIN does not need to be entered (at peak times etc.).

Table 11: Location table (defines which card groups get access to which room at which time)

Alias	Data type	Length	Description
ID	Number (int)	4	ID of the time model. All other tables refer to this data line via this number, if necessary.
Weekdays	Number (int)	7	Indicates the weekdays on which the following period of time should be applied to (form: 7 digits at most 1-7 e.g. 134567 = Monday, Wednesday till Sunday)
TimeStart	String (Time)	5	The start time for the period of time. (form: 24h HH:MM)
TimeEnd	String (Time)	5	The ending time for the period of time.

Table 12: Time table (grouping of single time zones (weekday from to) as a time model number)

Alias	Data type	Length	Description
Day	String (Date)	10	Date of the blocking day. (form: YYYY-MM-DD)
RefGroup	Number (int)	4	Indicates the authorization group to which the blocking day is applied. A zero defines a global validity for all groups.
RefTime	Number (int)	4	Indicates the assigned time model. (0 = not used) During this time access is granted. Thus, also "half holidays" like New Year's Eve can be realized.

Table 13: Holiday table (setting of blocking days like holidays or company holidays)

Alias	Data type	Length	Description
RefReader	Number (int)	4	Module (door module or master) on which is the digital input.
PortIn	Number (int)	1	Number of the digital input on the module.
RefAction	Number (int)	4	Reference to the action that should be carried out (e.g. switch relay).
RefTime	Number (int)	4	The time model which indicates when the digital input is checked. (0 = not used)

Table 14: Event table (assigning an action to a signal at the digital input)

Alias	Data type	Length	Description
ID	Number (int)	4	Action number, it can occur several times because of several actions that have to be worked through.
RefReader	Number (int)	4	Module (door module or master) on which an output(relay) is switched.
PortOut	Number (int)	1	Indicates the number of the output on the module.
Elapse	Number (int)	3	The duration of the switching of the relay (0 = permanently). Unit 200 ms
RefTime	Number (int)	4	The time model indicates when the output may be switched. (0 = not used)

Table 15: Action table (list of all workable actions in the access control system; an action group - all actions with the same action number - can switch several relays)

3.9 Timing of the digital exits for the MasterIV device series

It is possible to time the digital outputs of the MasterIV device series via tables. Thus, for example a turn down of the heating system at night, a buzzer control and much more can be realized.



Caution:

In order to use the timing of the digital exits, the firmware version 04.01.01.17 (or higher) has to be installed on the terminal.

The following tables have to be configured:

- ▶ Action
- ▶ Reader
- ▶ Time

Description:

Each action that should be activated has to be entered in the table Action. The table Action refers to the tables Reader and Time. In the table Reader the module is left on which the relay or the Open Collector is to be switched. The reference to the table Time indicates when the switch shall be done. If start and stop time are entered, the relay is **switched on** when exceeding the start time and **switched off** when exceeding the stop time. The entry of the duration **Elapse** in the table Action is ignored. If the relay should only be activated for a few seconds, e.g. for a buzzer control, the stop time has to be set on "00 : 00". If the start time is exceeded, the respective exit will be switched for X seconds (*RefTime* in Action table). The entry **Elapse** in the table Action now indicates the on-time.

Example:

- ▶ A buzzer is to be activated for **3** seconds from Monday to Friday at **10.00** am and 4 pm **16.00**. The buzzer is controlled by the internal relay of the BDE-MasterIV.
- ▶ The heating system is to be turned on the "day mode" at **07.00** am and on the "night mode" at 7 pm **19.00** on all weekdays. The corresponding relay is at the door module with the bus number **2**.

Reader.txt

```
; ID ZM TM RefLocation RefAction PinGeneral
1 1 320 0 0 0
2 1 020 0 0 0
```

Time.txt

```
; ID Weekdays TimeStart TimeEnd
3 12345 10:00 00:00
4 12345 16:00 00:00
5 1234567 07:00 19:00
```

Action.txt

```
; ID RefRead PortOut Elapse RefTime
6 1 1 15 3
7 1 1 15 4
8 2 1 0 5
```

3.10 Access control II with PHG modules

The following hardware is available to set up an access control with PHG modules. The devices can be combined in different ways according to their hardware requirements.



BDE-MasterIV

If the BDE-MasterIV is used for the access control, door supervision or remote monitoring, one device can supervise up to 8 doors and control 12 doors at most.



VOXIO

Unterputz: 81 x 81 x 11 mm (BxHxT)

Aufputz: 81 x 81 x 40 mm (BxHxT)

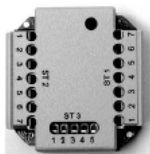
The VOXIO can be used with Legic or Mifare. It is available for in-wall or on-wall mounting with or without keyboard. Each reader has a sabotage recognition, three lamps for visualising the state and a buzzer for the acoustic signalling.



RELINO

50 x 50 x 43 mm (BxHxT)

The RELINO reader can be used with Legic or Mifare. It is available for in-wall mounting. Each reader has three luminous fields for visualizing the state and a buzzer for acoustic signalling.



I/O-Box

51 x 48 x 22 mm (LxBxH)

The I/O-Box as equipment for the RFID-wall reader or RELINO reader has two digital inputs and two digital outputs. The I^2C bus is used as interface.

3.10.1 Connection

In order to connect the PHG modules please note the PHG documentation on the Datafox CD:

..\Datafox-Geräte\Datafox-Zutritt-Module\PHG *.pdf

In the PHG documents for the single modules the pin assignment and configuration via the DIP switches are described. In order to carry out an access control with the BDE-MasterIV the option "access" has to be integrated (Datafox Art. no. 105201). The following figure shows the possible connections of PHG devices to a BDE-MasterIV for an access control.

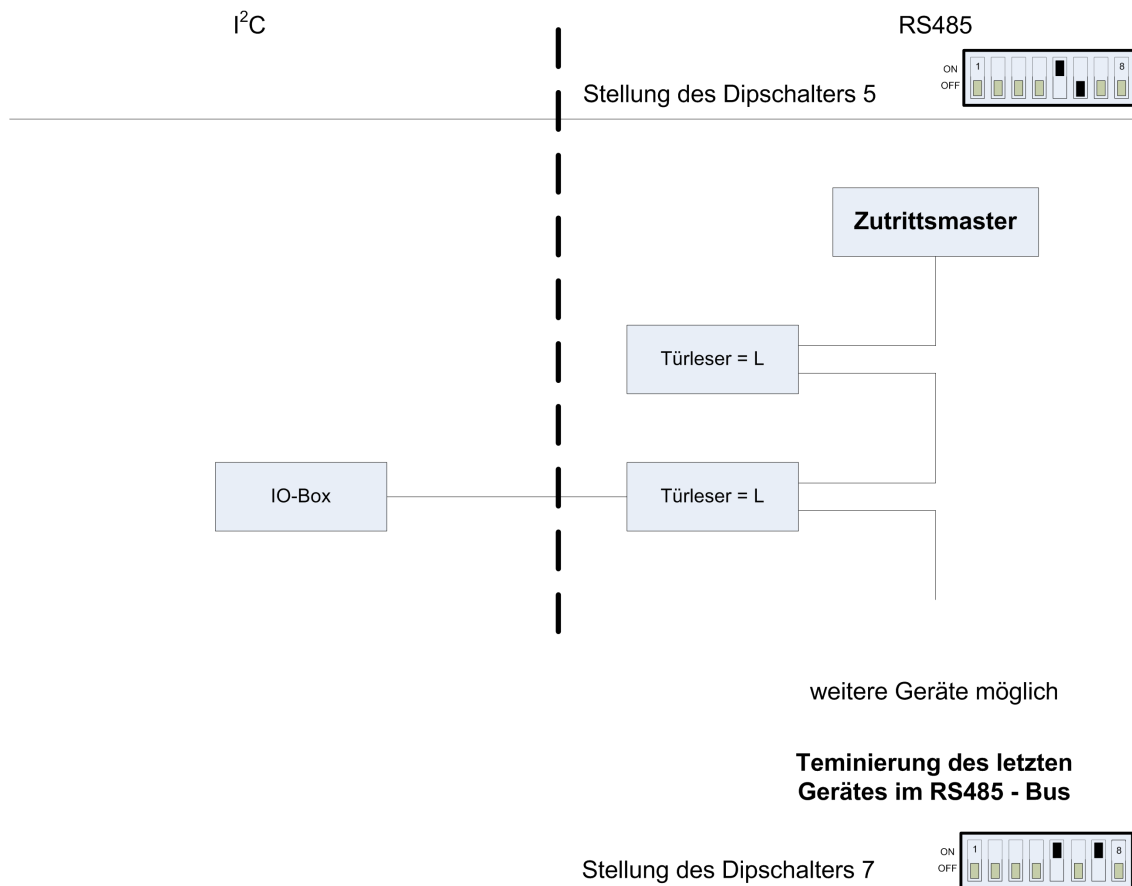


Figure 57: Connection of the access control II

The bus number of the module is set via the DIP switches 1 - 4. The DIP switch 5 always has to be at "ON". The DIP switches 6 and 8 always have to be at "OFF". With the DIP switch 7 = "ON" the RS485 bus is terminated at the last module, otherwise always "OFF".

If additionally a door-opener is to be controlled via a relay, the IO-box has to be used. With the IO-box two digital exits as relays are available.

3.10.2 Configuration

The access modules of PHG with phg-crypt-protocol use an encryption in accordance with the Rijndael / AES-128 standard (AES - Advanced Encryption Standard). The code is set in the setup under access after selecting the access series. The 1685 protocol of PHG is not supported by Datafox.

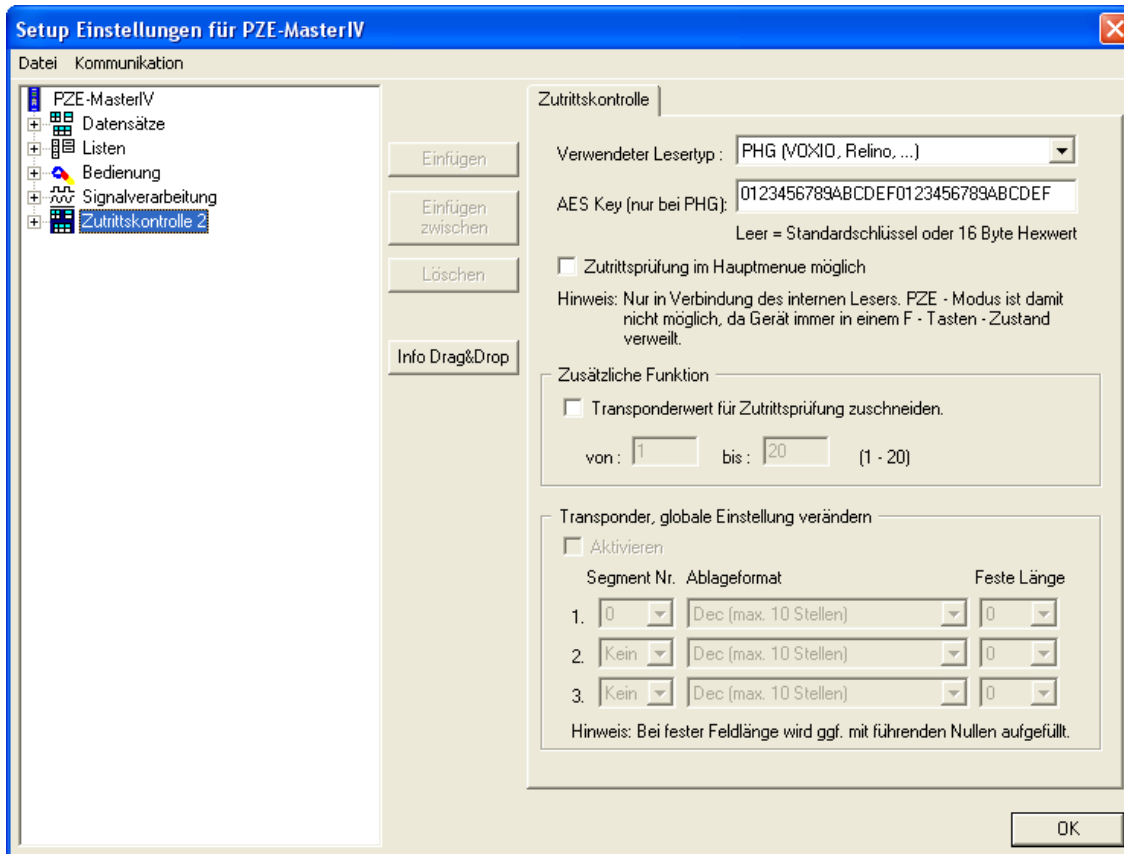


Figure 58: Communication key for the PHG-crypt protocol

The modules always work with encryption. If no code is entered, a not published standard code is used; otherwise, the entered user code is used. Please use all the 16 byte of the code.

All door modules that are compiled in the reader table have to be available in the RS485 network in order to guarantee that the code can be changed in all modules, if a new setup with a different code is loaded. If a door module from the list is missing in the bus, no change of the code takes place. The old setup with the old code has to be reloaded; otherwise, after rebooting the device it is not possible to communicate with the door modules until the right code is used again.

If a defective reader is replaced by a new reader that has not been used yet, the firmware recognizes this automatically at the start and sets up the encryption. The reader can also be changed during operation, the firmware automatically integrates it.

If you have forgotten the user code for a door module, there is no possibility to activate the readers. The reset of the forgotten key at the reader can only be done by PHG.

3.11 Status message of the access control

For the admission control following state messages are defined. The decimal values of the state message can be saved to every data record.

Display	Assigned status message
0	Module recognised, everything is okay
3	Module not defined in the list but found in the bus
4	Module from the list not found in the bus
5	Module wrong coding password
6	Module wrong login password
7	Module wrong reader type (Mifare, Legic, Unique, etc.)
8	Module error while configuring the module
9	Module neither found in the list nor in the bus (is not used)
10	The communication key for the PHG-Crypt-protocol has been changed
11	The communication key for the PHG-Crypt-protocol has not been changed

Table 16: Initialization / Communication

Display	Assigned status message
20	Access granted for this card number
21	Card number not contained in the identification list
22	Card number blocked
23	Time of validity of card number expired
24	Room not contained in the location list
25	No access during this time
26	Awaiting PIN entry (green LED flashes)
27	Entered PIN is invalid
28	PIN with menace code was entered
29	Entered PIN is OK
30	Entered master PIN is OK
31	Time-out for PIN entry
32	Card number with general authorization
34	Card number in the online mode read
35	PIN in the online mode read
100	Access control deactivated in the setup
101	At the moment the access control cannot be called up (busy)
102	Access control needs the lists
103	Incorrect bus type (Datafox, PHG, etc.)

Table 17: Access control

Display	Assigned status message
40	Digital output 1 is low (off)
41	Put digital output 1 on high (on)
42	Digital output 1 is trigger (on for given period of time)
43	Digital output 2 is low (off)
44	Put digital output 2 on high (on)
45	Digital output 2 is trigger (on for given period of time)

Table 18: Digital Output

Display	Assigned status message	
	GIS	PHG
60	Digital input 1 is low	IO-Box closed
61	Digital input 1 is high	IO-Box open
62	Digital input 2 is low	IO-Box closed
63	Digital input 2 is high	IO-Box open
64	Digital input 3 is low	sabotage supervision -> communication channel OK
65	Digital input 3 is high	sabotage supervision -> communication channel interrupted
66	Digital input 3 was interrupted	PHG not used
67	Digital input 3 was short-circuited	PHG not used
70	not used	Digital input 1 reader low
71	not used	Digital input 1 reader high
72	not used	Digital input 2 reader low
73	not used	Digital input 2 reader high
74	not used	Alarm control panel -> state of device OK
75	not used	Alarm control panel -> device manipulated

Table 19: Digital Input

3.12 IO-module

The Datafox IO-module offers the possibility to handle digital and analogous outputs of machines, vehicles, etc. It can be used directly at the PC, AEIII+, AE-MasterIV, BDE-MasterIV or in connection with a Mobile-MasterIV. It was especially planned for a use with Datafox devices. Therefore, it is completely integrated into the data collection possibilities of these devices. Thus, it makes possible to record both production/ machine data and process data with one system. This is advantageous, because the order data are already recorded via the BDE (Betriebsdatenerfassung - production data collection). The process data can be added easily and at minimal effort. The requirements of the product liability law and the ISO 9001 can be realized at relatively low costs.

Please gather a more detailed description of the technical data and the connection of the IO-module from the IO-module manual.

3.13 Bar code reader

If for the data transmission a communication different from RS232 is used, the RS232 interface (D-sub 9 pole) of the BDE-MasterIV can be used for connecting a bar code reader.

The configuration of the bar code that is to read is done via the setup. The bar code reader is set with the help of the configuration code. The codes are provided on the Datafox CD.

You can connect all bar code readers which have a RS232 interface. Please note the pin assignment of the RS232 interface given in the table below.

Pin assignment for a bar code reader via RS232		
Pin	Bez.	Function
1		
2	TxD	Transmission data (connect to RxD of the bar code reader)
3	RxD	Received data (connect to TxD of the bar code reader)
4		
5	GND	Masse
6	+ 24V	+ 24 V supply 100 mA at most (solder bridge on edge connector necessary)
7		
8		
9	+ 5V	+ 5V Supply 150 mA at most

Table 20: Bar code reader over RS232

We use bar code readers of the company Datalogic by default and already make the right settings at delivery. You can find the corresponding bar code readers with the suitable cables in the price list.

Basic setting of the bar code reader Datalogic DLC-series for using it with the PZE-MasterIV.

With the basic configuration EAN8, Standard Code 39 and Interleaved 2/5 can be read. In order to make the basic settings read the bar codes 1.) RESTORE DEFAULT and 2.) RS232. If other bar codes are to be read, carry out the initialising according to the manual of Datalogic. A brief instruction is included in the cardboard of the bar code reader. The CD contains the whole manual "Handbuch Datalogic_Barcodeleser.pdf".

3.14 Status signals

It is possible to connect a status signal in the form of a signal lamp to the BDE-MasterIV. If you use an external voltage source, the connection can be done as shown in figure 59.

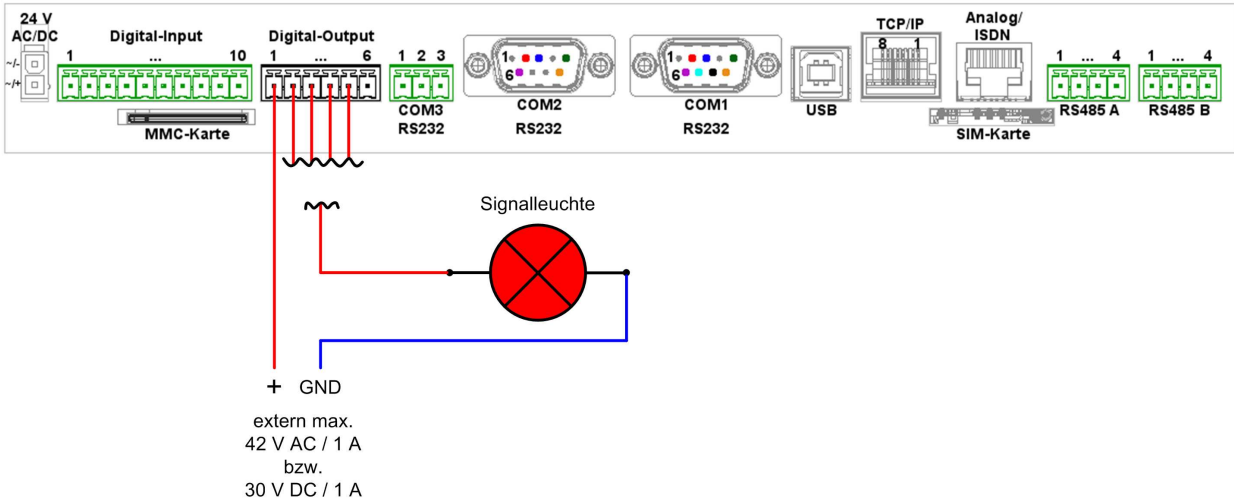


Figure 59: Connection of the signal lamp via an external tension spring

If you renounce an external voltage source, y interface for the RS485A main communication has to be available. 24 V DC are made available via the PIN 1 of the RS485A interface (see chapter 3.6.7). Corresponding to figure 60 they can be used for connecting a signal lamp.

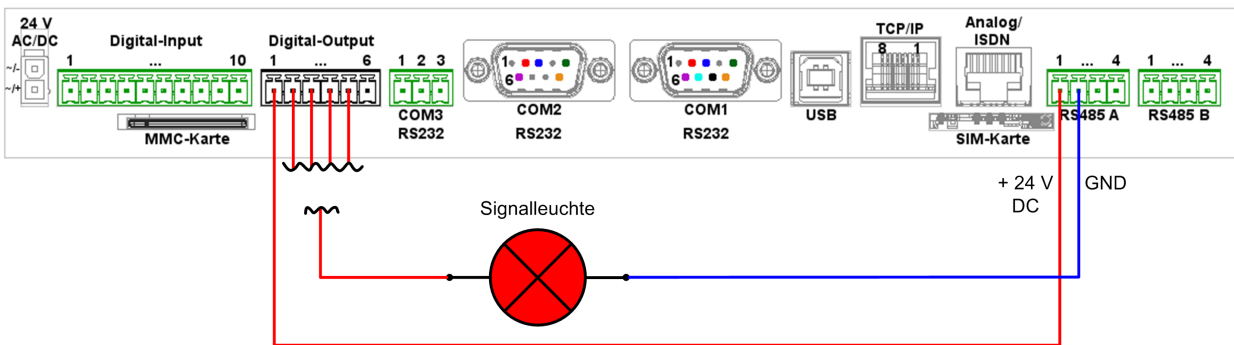


Figure 60: Connection of the signal lamp via the internal voltage source of the RS485A interface

4 DatafoxStudioIV - General operation



Note:

The dialogues can differ from the presentations in this manual, dependent on the version of the DatafoxStudioIV. This also applies to differences in functionality.

4.1 Installation

The DatafoxStudioIV is required for setting up and changing the device setup. The setup and communication program just consist of the files DatafoxStudioIV.exe and DFComDLL.dll. A real installation is not necessary. Just copy the files into the desired directory and create a link to DatafoxStudioIV.exe in the program menu or at the desktop.

System requirements

- ▶ PC with Microsoft Windows 95/98/NT/2000/ME/XP
- ▶ 64 MB RAM
- ▶ minimum 2 MB HD memory

Use



Caution:

If there are different versions of the DFComDLL.dll on the PC where the program DatafoxStudioIV is run, it can lead to malfunctions, because possibly a wrong version of the DLL is loaded by the program. Therefore, always pay attention to the software version and compatibility (see chapter 2.1).

User interface

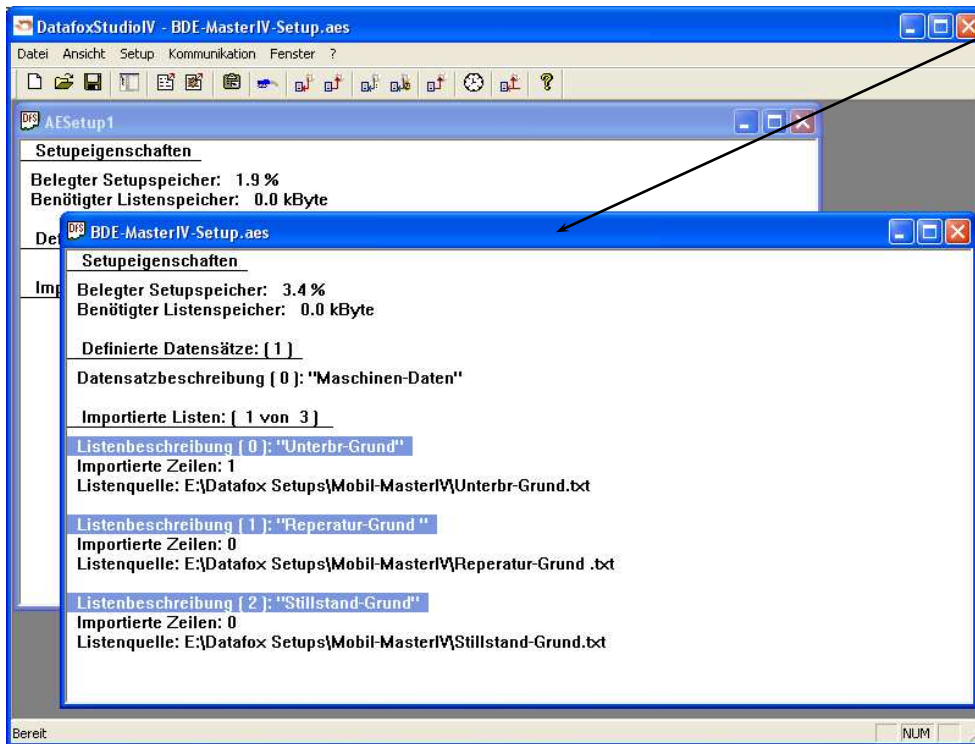
Description of the main menu items

File:	Open, save, create setup file
View:	Hide and unhide status bar and toolbar
Setup:	Basic settings like edit setup, import lists, set data storage, load firmware and device maintenance via modem connection
Communication:	Setting of the communication, commands for a communication between the PC and the terminal
Window:	Set the order of the windows
?	Information about the program and version requirements for the firmware and DF-ComDLL.dll

The single functions are explained in detail in the following chapters.

4.2 Operation of the DatafoxStudioIV

All functions you need about the setup are available via the menu of the DatafoxStudioIV. The most important functions can additionally be called up via the toolbar.




Client-Window

The edition, e.g. writing setup, etc., always refers to the current marked window. The file name of the setup file is visible in the title bar.

Figure 61: DatafoxStudioIV User interface

As long as the setup-mask-dialogue is opened you have no access to other functions of the DatafoxStudioIV. Only if the dialogue is closed, you can call up and carry out other functions from the studio for the setup that is chosen currently.



Note:

Please take into consideration that, if several setups have been opened in the main window of the DatafoxStudioIV, the changes only refer to the currently chosen setup. This means the setup window which is not covered by another window.

4.3 Menu Datei

Under the menu item < *Datei* > are several standard functions that you know from other office applications and that are not examined further. Such functions are for example < *Speichern* > for saving changes.

4.3.1 Creating a new setup file

You can create a new setup file via < *Datei* => *Neu* >. A new client window will be opened in the DatafoxStudioIV. After creating a setup file you should save it under the name of your choice. After successfully saving the setup file the new file name will be displayed in the title bar of the client window. With that, the creating of a new setup file is finished. The setup now can be edited at will.

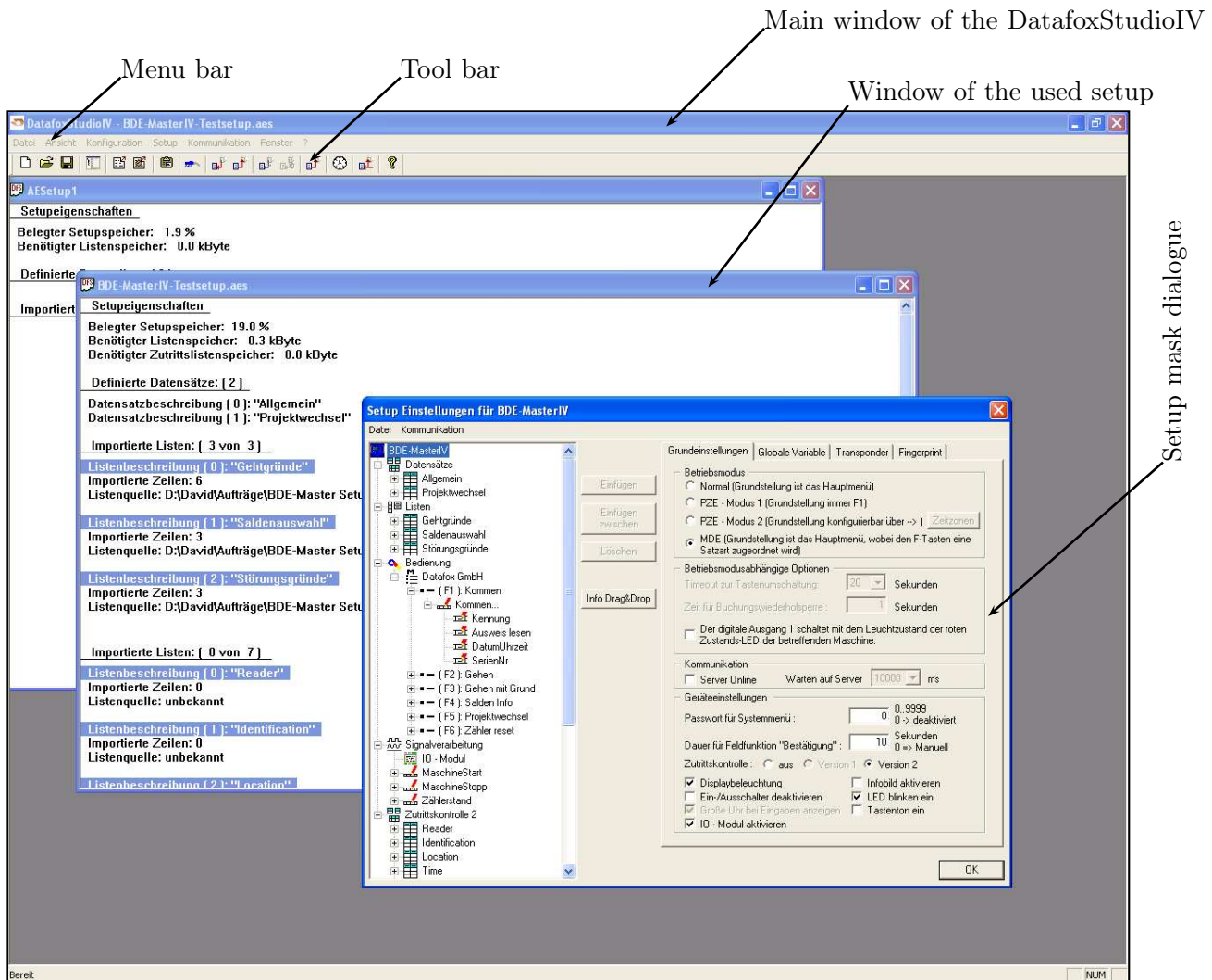


Figure 62: User interface of the DatafoxStudioIV

4.3.2 Open setup file

In order to open an already created setup file with the DatafoxStudioIV, click on *< Datei => "Ofnen >* in the menu and select the directory that contains the file. Open the file with a double click on it.

!

Caution:

You should note that if you open a setup file that was created with a previous version of the DatafoxStudioIV, the file is converted into the new setup format by the DatafoxStudioIV. Then, it is not possible any longer to open this converted setup file with the previous program version. The DatafoxStudioIV back-ups the setup file before converting it. The back-up copy has the file extension (*.bak). By renaming the file extension (.aes) you can open and edit it with a previous program version (AESetup).

4.4 Menu Setup

4.4.1 Edit

Via the menu item < *Setup* => *Editieren* > you reach the domain of the DatafoxStudioIV where you can edit a setup. You can find a more detailed description of the procedure in chapter 5.



Note:

By double clicking on the white surface of the window, this menu order is carried out as well.

4.4.2 Import lists

Achtung:

All lists must be provided with the sign coding ISO-8859-1.!



Via the menu item `< Setup ==> Listen importieren >` all necessary lists can be imported into the setup program. Select the lists as shown in the figure opposite and open them. You can select several files at the same time by pressing and holding the Ctrl key.

Figure 63: File selection dialogue for list import

All imported lists are displayed in the main window of the setup under the item *Importierte Listen : (n von m)*. The link to the memory location of the lists, paths and file names are saved with the setup. A selected list is only imported if it corresponds to the list definition of the setup (see chapter 5.2.5).

If a list definition was changed in a setup, all list have to be transmitted again after transmitting the setup to the device.

4.4.3 Import access control lists

The access control lists are defined in the setup with a fixed name and structure. The lists have to be selected and imported corresponding to these definitions. In order to import access control lists, proceed analogous to the list import (see chapter 4.4.2).

4.4.4 Configure data storage

Under the menu item < Setup => *Datenablage konfigurieren* > a dialogue opens where you can set how the read out data records should be saved.



Figure 64: Configuration of the data storage

You can define if an existing file should be overwritten or if the data shall be added to the file.

Furthermore, you can set the output format and define if and how field names should be used in the data files in order to be able to identify the field values more easily.



Caution:

If you read out data from several terminals and want to unite them into a single file, you necessarily have to activate the option "Add data to file" in order to avoid data loss. Otherwise, only the data of the terminal that was read out last are preserved.

4.4.5 Load firmware

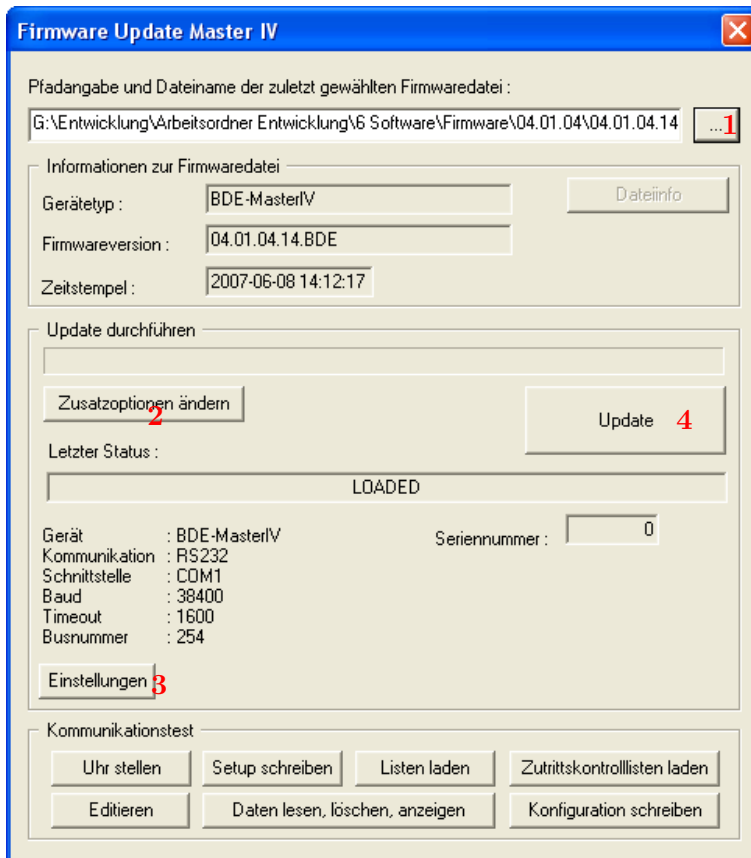


Figure 65: Firmware update dialogue

In order to guarantee a faultless firmware update, the possibly connected machine should be tuned off during the update process.



Caution:

Please note at all costs the information under software versions and compatibility as well as firmware update/ downgrade in the chapters 2.2.1 and 2.2.2.

You can make all necessary settings for a firmware update via the menu item *< Setup => Firmware laden >*.

You can select a *.zip archive which contains the firmware file (*.hex) for the BDE-MasterIV via the button (1).

Via the button *< Zusatzoptionen ändern >* (2) you can select the access series (TS/ PHG) you use. It is important that this is done **before** the firmware update, otherwise the wrong firmware (wrong access series) could be installed.

Before transmitting the *< Einstellungen >* (3) for the communication (kind of communication, timeout etc.) should be checked. If all settings are correct, the update can be started via the button *< Update >* (4).

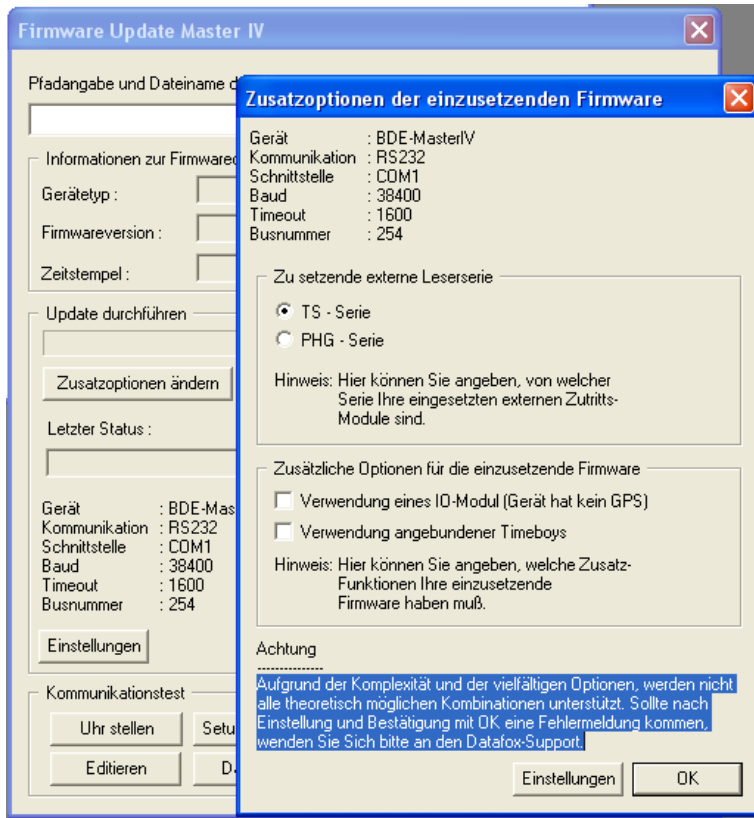


Figure 66: Additional options

With the Additional options you can define which additional functions have to be provided by the firmware.

This is especially important for the firmware updates from version < 04.01.04.32. In this case at first a firmware update with the version >= 04.01.04.32 has to be done. Only then the terminal can set the additional options.

Now set the additional options and apply them to the terminal by pressing OK. It is very important that now you do again a firmware update.

Only now, with the information from the terminal, the DatafoxStudioIV can select the appropriate firmware from the device file archive via the additional options.

4.4.6 Device maintenance via modem connection

It often happens that a BDE-MasterIV is autarkically installed as data entry terminal at a machine or plant. In this case it would be very time-consuming to do a firmware update with direct connection to a PC. Therefore, it is possible to transmit data to the device or read them from the device via a modem connection.

All settings to take here, except for the PIN and phone number, refer to the configuration of the modem at you PC. That means, the external modem at the terminal has already to be configured for such a connection.

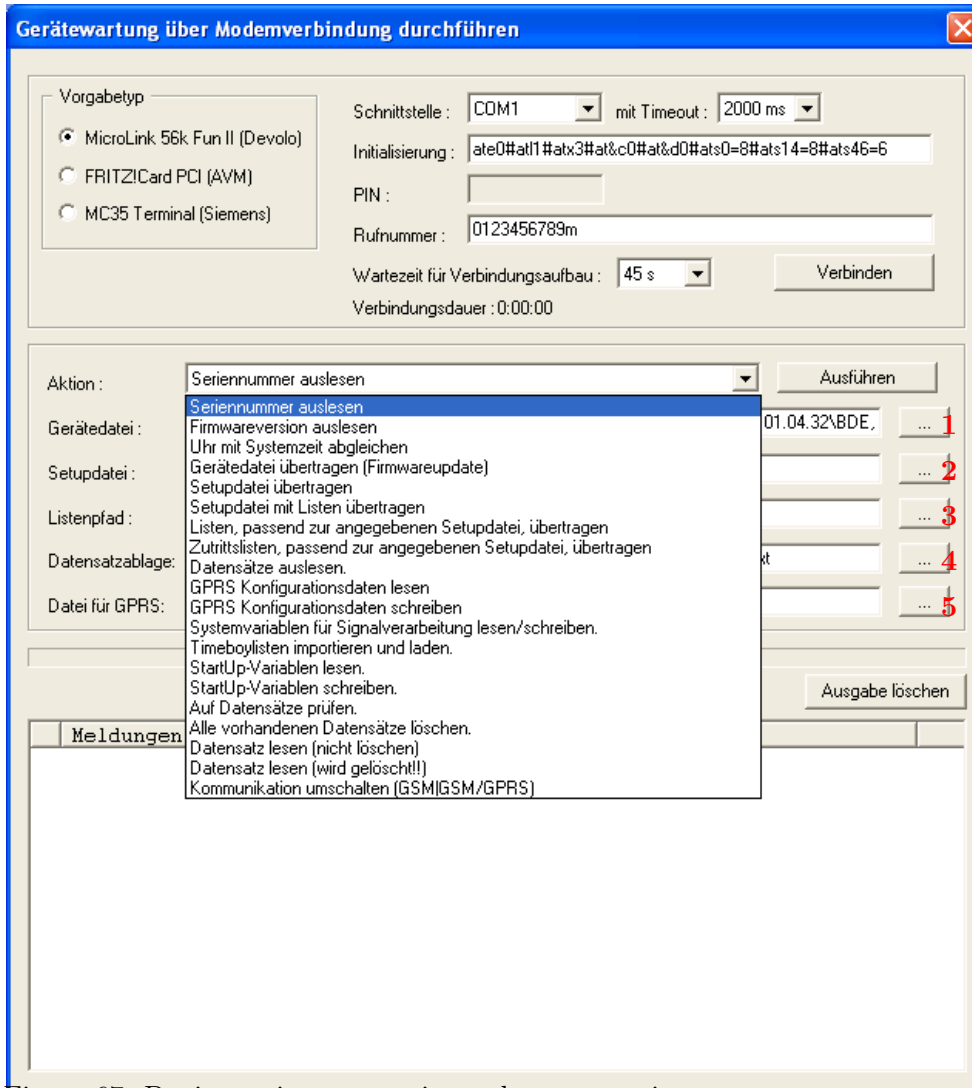


Figure 67: Device maintenance via modem connection

4.4.6.1 Functions for device maintenance

- ▶ Read out serial number
- ▶ Read out firmware version
- ▶ Compare clock with system time
- ▶ Transmit device file (firmware update) - Via the button **1** in figure 67 a dialogue opens where you can select the device file with the extension ".hex". When you have marked the file, you can take it over via the button "Open".
- ▶ Transmit setup file - Via the button **2** in figure 67 a dialogue opens where you can select the setup file with the extension ".aes". When you have marked the file, you can take it over via the button "Open".
- ▶ Transmit setup file with lists - Via the button **3** in figure 67 a dialogue opens where you can define the folder (path) that contains the list files.
- ▶ Transmit lists matching to the given setup file - Only the list data of the button (**3**) are transmitted here.
- ▶ Transmit access lists matching to the given setup file - Here the access lists have to be assigned to the button (**3**)

- ▶ read out data records - Via this function you can read out data records from the BDE-MasterIV. Via the button **4** in figure **67** a dialogue opens where you can define the folder (path) in which you want to save the data records.
- ▶ Read GPRS configuration data - Via the button **(5)** a dialogue opens where you can define the GPRS.ini. Just create a new file, name it GPRS.ini and select it. Now, the current GPRS configuration is read from the device and written into the *.ini file.
- ▶ Write GPRS configuration data - Select the configuration file (GPRS.ini) that contains the desired settings via the button **(5)**.
- ▶ Read/ write system variables for signal processing - A selection dialogue opens where you can select the desired system variables of the digital inputs and then read or write them. See chapter **4.5.9**.
- ▶ Import and load Timeboy lists - The dialogue "Import and transmit data of the lists of the Timeboy" opens. See chapter **4.5.3**.
- ▶ Read StartUp variables - Via this function you can read out the StartUp variables.
- ▶ Write StartUp variables - Via this function you can write StartUp variables.
- ▶ Checking for data records - It is examined whether there are data records in the device.
- ▶ Delete all existing data records - Deletes all data records from the device. This is absolutely necessary before you can install a new firmware or setup.
- ▶ Read data record (not delete) - reads a selected data record without deleting it
- ▶ Read data record (is deleted!) - reads a selected data record and then deletes it
- ▶ Switch over communication (GSM, GSM/GPRS)



Note:

In order to carry out the functions "Transmit device file" and "Transmit setup file", no data records must be on the device. In this case you first have to read out all data from the device (see chapter **4.5.4**).

4.4.7 Edit text data of the firmware

From version 04.01.06. x you can edit the text data of the device firmware about DatafoxStudioIV. Open the edit dialogue about the menu < Setup => *Textdaten der Firmware bearbeiten* >. Open now an device file archive *.dfz. The Defaulttexte of the firmware with a description are indicated.

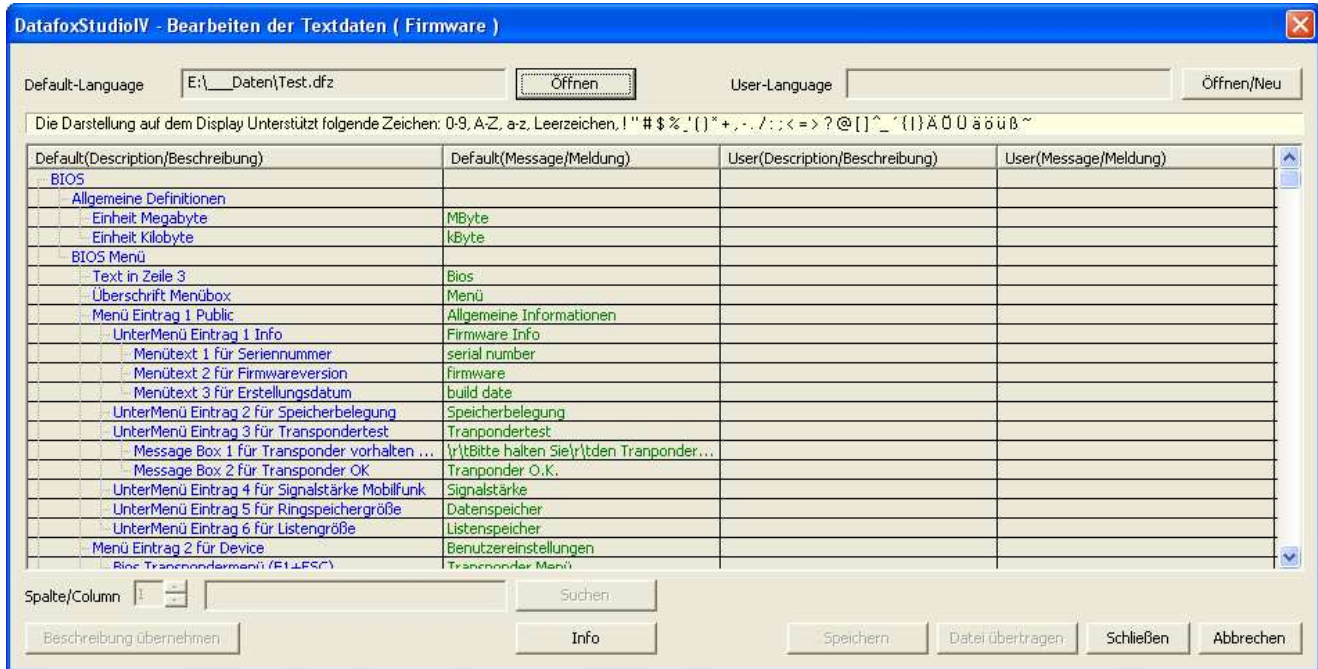


Figure 68: Default Text-Datendatei Öffnen

Open or generated now a new linguistic file for the firmware with the ending *.dfi. If you have generated a new file, the right side of the list is empty.

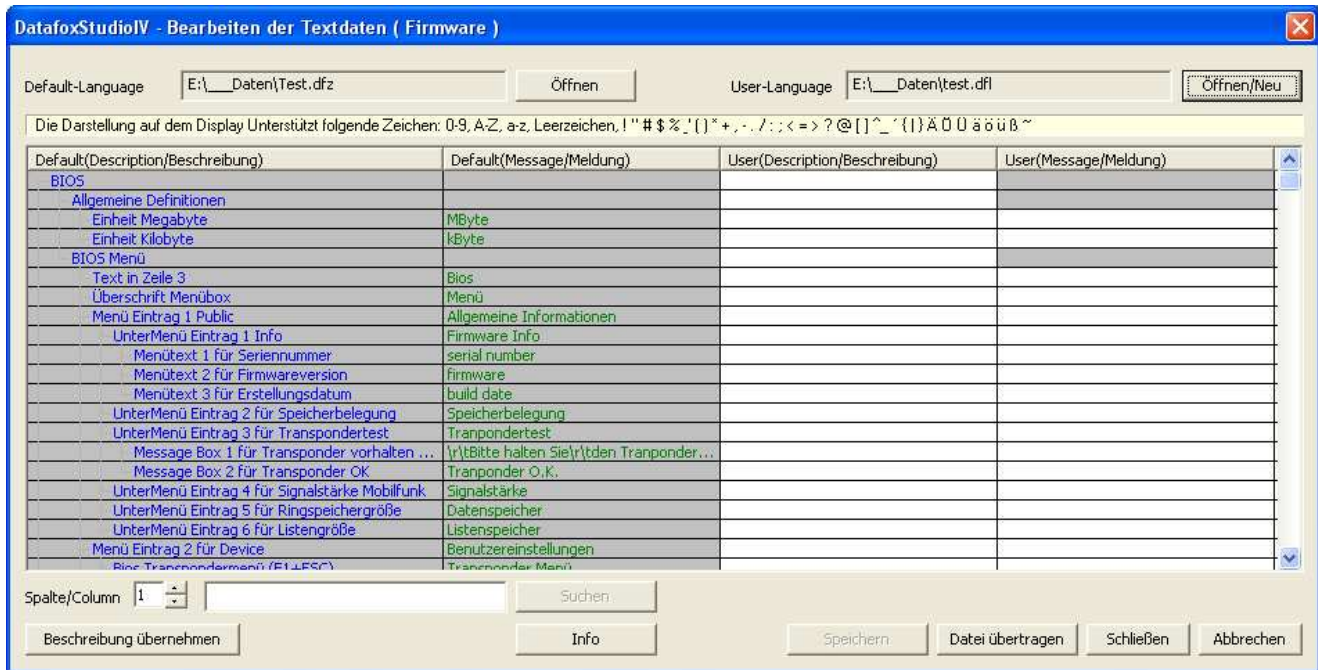


Figure 69: User Text-Datendatei Erstellen bzw. Öffnen

Innerhalb der Liste arbeiten Sie nur mit einfachen Mausklicks, KEINE Doppelklicks. Selectieren Sie mit einem einfachen Klick eine Zeile aus der Liste.

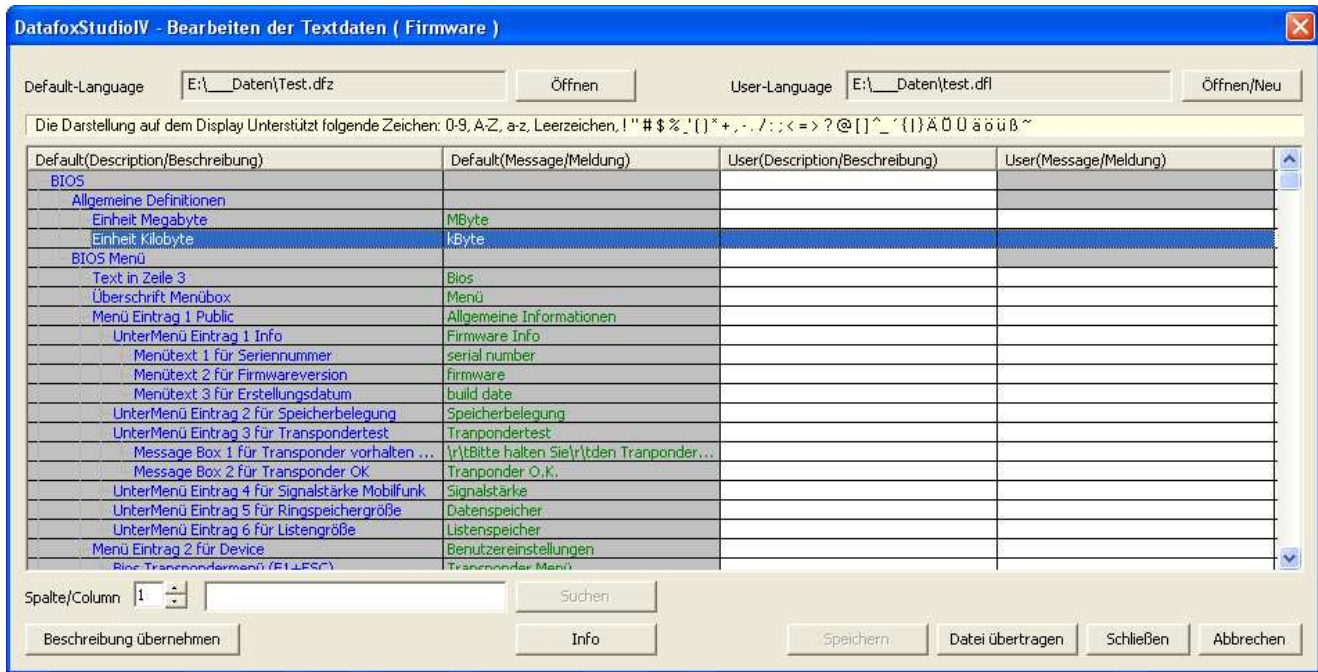


Figure 70: Zeile auswählen

With the next single click in the column of user(description/...) or user(message/...) you put the cursor in this field.

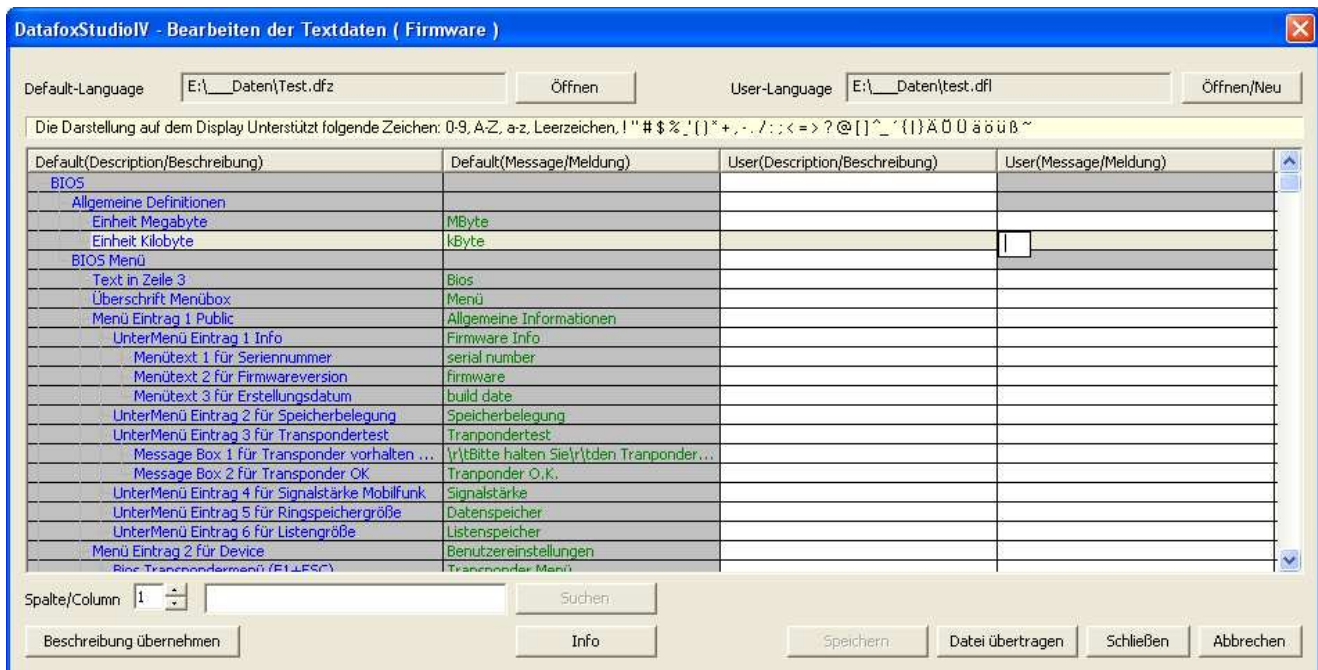


Figure 71: Zelle zum Bearbeiten auswählen

Now you can edit the text.

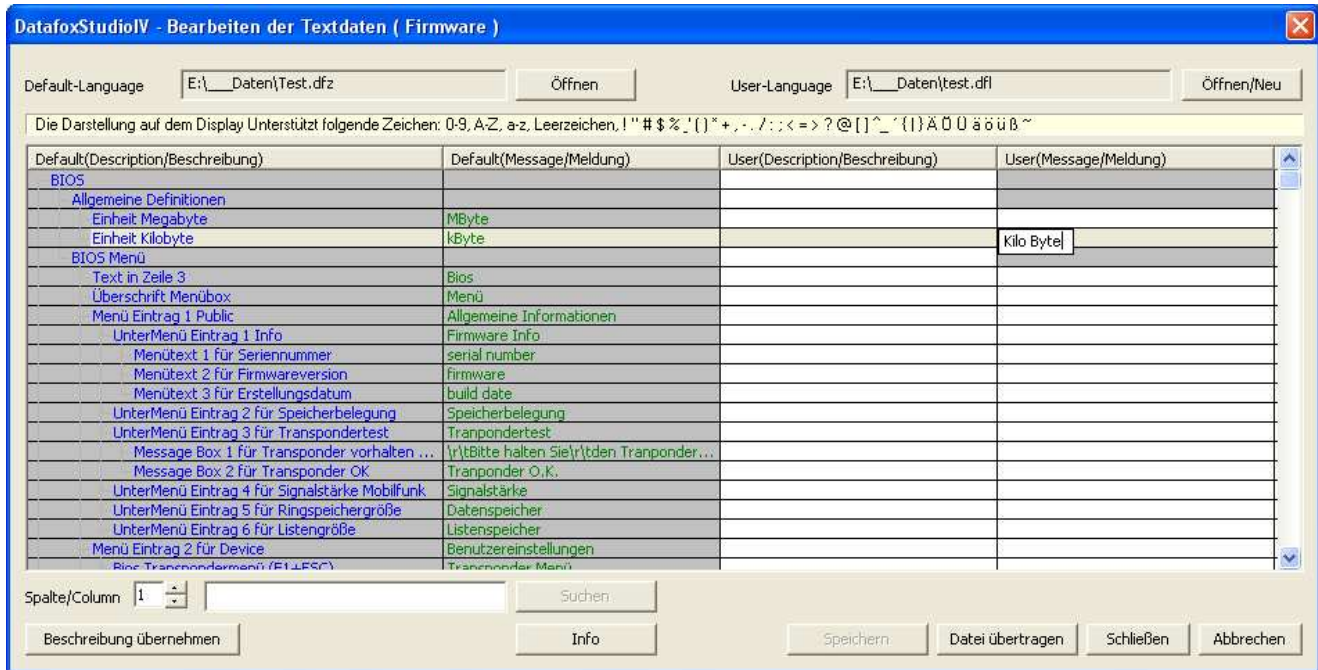


Figure 72: Textdaten eingeben bzw. bearbeiten

If you conclude the input, the description from the column default(description/...) is taken over.

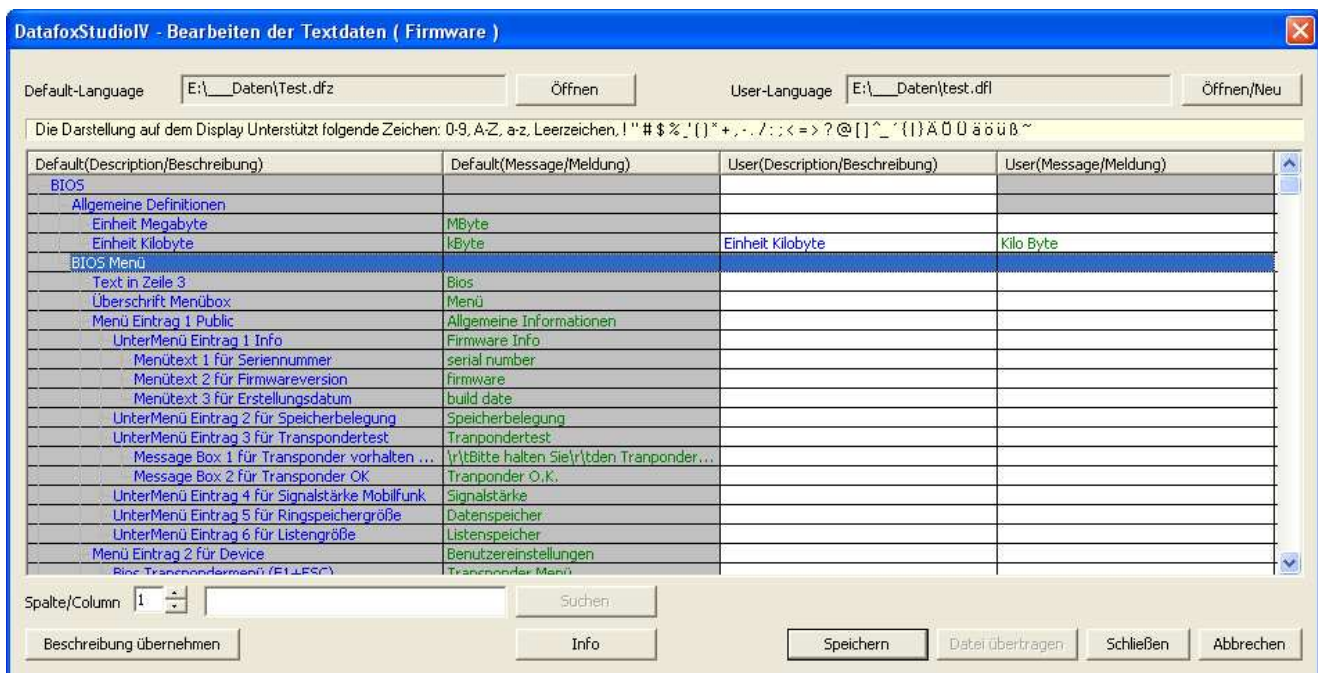


Figure 73: Änderungen übernehmen

You can change this text now in the column user(description/...). To transfer user to text data, they store all changes.

It is available to you a full text search. Give the text and choose the column which you would like to search for the text.

4.5 Menu Communication



Note:

You can and should check all displayed communication parameters at each dialogue that opens with one of the following function calls, and adjust them via the button Settings if necessary.

4.5.1 Write / read setup

When the setup is finished, back-up it on disk via *< Datei => Speichern unter >*. For transmitting the setup you have to set the communication parameter for the device in question via *< Kommunikation => Einstellungen >*.



Caution:

Always check the communication parameter before transmitting the setup. This is especially important when several devices are managed via the DatafoxStudioIV. Pay particularly attention to the IP address of the device to which you want transmit the setup.



Figure 74: Transmitting setup data

The device is only ready for operation with a completely transmitted setup. If the transmission is aborted early, the device cannot be put into operation. In this case, a possibly existing disturbance source has to be eliminated and the transmission must be repeated.

Likewise, a setup can be read out from the device in order to change it or to configure a second device with the same setup. Open the corresponding dialogue via *< Kommunikation => Setup lesen >*, give a file name for the setup and check the communication settings. With OK you confirm all entries and the setup is read out from the device.

4.5.2 Load lists/ access control lists

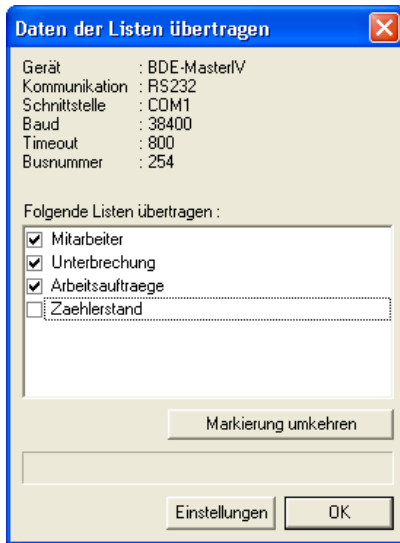


Figure 75: Load lists

The loading of the lists / access control lists is done via the function < *Kommunikation* => *Listen laden* > or for the access control via < *Kommunikation* => *Zutrittskontrolllisten laden* >. This functions are also available in the DLL and can be used via own applications.

If devices are activated via the DLL, the lists can be directly transmitted from an application without previously creating an ASCII file.

4.5.3 Import and load Timeboy lists

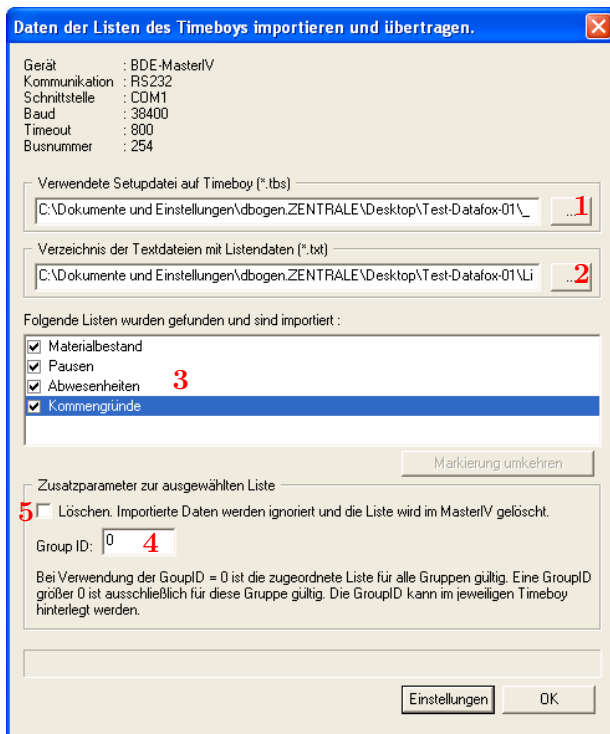


Figure 76: Import and load Timeboy lists

You can start the dialogue for importing Timeboy lists via the function `< Kommunikation => Timeboylisten importieren und laden >`. Here, at first you select the path to the desired Timeboy setup (1) and then the path to the Timeboy lists (2). The lists whose information matches the list description of the Timeboy setup are displayed now (3). You can define the Group ID (4) via the additional parameters and thus assign the special lists e.g. for certain fields of activities. The Group ID is logged on the Timeboy. Additionally, you can delete lists from the BDE-MasterIV (5).

This functions are also available in the DLL and can be used via own applications.

4.5.4 Read, delete, display data

The setup program offers simple functions for reading out and deleting data from the device. Only ASCII files can be created. For different output formats the use of the communication DLL or Datafox-Talk is advisable. Please not chapter 2.3.2.

The respective formats and options for the filing of data in the ASCII file are set via `< Setup => Dateiablage konfigurieren >`, as described in chapter 4.4.4.



Caution:

In a network the option "Add data to file" (if this file already exists) has to be activated. Otherwise, at the download the data are overwritten by the following devices and only the data from the last device are available.

4.5.4.1 Read data and delete them

You can read out the data records from the device via the menu < *Kommunikation* => *Daten lesen, löschen* >. The reading out of the data records is done separately.

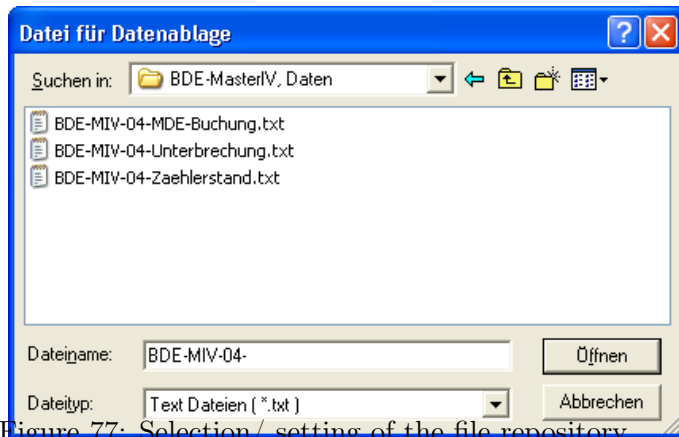


Figure 77: Selection/ setting of the file repository

After the function call

< *Daten lesen, löschen* >, a file prefix for saving the data records has to be given. For each data record description of the used setup, an own text file is created for the existing data records. The file name consists of the given file prefix and the name of the data record description.

Example:

At the reading and deleting of data the files PZE-MIV-04-PZE-Meldung.txt and PZE-MIV-04-Zutrittsmeldung.txt are created if for all data record descriptions for the forth device PZE-MIV-04 is set as file prefix in the file selection dialogue and the data record descriptions "PZE-Meldung.txt" and "PZE-MIV-04-Zutrittsmeldung.txt" are created in the setup.

If you set the current date in the file prefix, you create a history of the data backup. The date in the form yymmdd, e.g. PZE-MIV-02-060514 would result in a chronological ordered back-up of the files.

If a file is newly selected or created, a query appears whether you want to use this file as standard filing for the data.

After opening the file a dialogue for reading out the data records appears. Via this dialogue the communication parameter have to be checked via < *Einstellungen* >. But above all the communication and the IP address have to be checked and set if necessary. The option "Pollen" offers the possibility to read out several devices permanently, this is also called collecting process, and to back-up the data on the local disk. The devices are read out one after the other here. Via the parameter "Time between the collecting processes" a period of time in seconds can be set as break between two read out processes, **not** between the reading out of two devices.

4.5.5 Set time

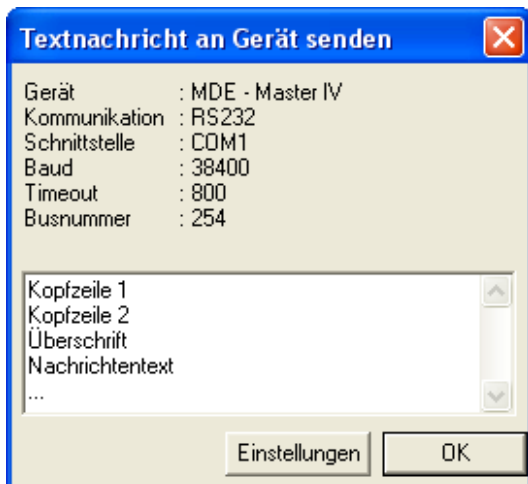
Via the function $\langle \text{Kommunikation} \Rightarrow \text{Uhrstellen} \rangle$ you can compare the time of the device with the system time of the PC from which this function is called.

4.5.6 Read serial number

With the function $\langle \text{Kommunikation} \Rightarrow \text{Seriennummer lesen} \rangle$ you can read out the number of a device. It is displayed via a separate dialogue.

4.5.7 Send message

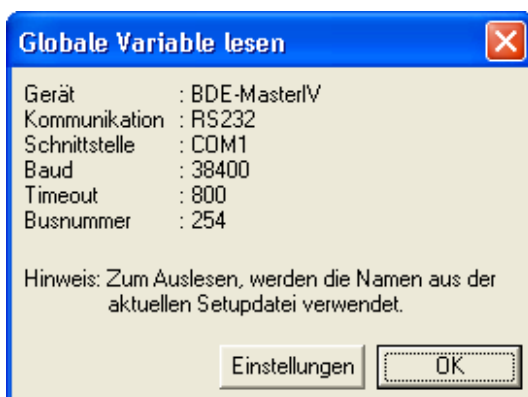
In practice, information can automatically be made available to the user from the server with the function $\langle \text{Kommunikation} \Rightarrow \text{Nachricht senden} \rangle$. In the DatafoxStudioIV this function is used for example to point out the transmission of new data to the user (e.g. in order to prepare for the transmission of an updated setup).



As shown in the figure, the text that is to be set consists of two headers, a title and the message.

Figure 78: Send a message

4.5.8 Read global variables



Via the function "Read global variable" you can check which value has a global variable in the device.

Figure 79: Values of the read variables



Figure 80: Values of the read variables

At the function call all global variables are read out from the device and shown with their current value.

4.5.9 System variables of the signal processing

You reach this dialogue via *< Kommunikation => Systemvariablen der Signalverarbeitung >*.

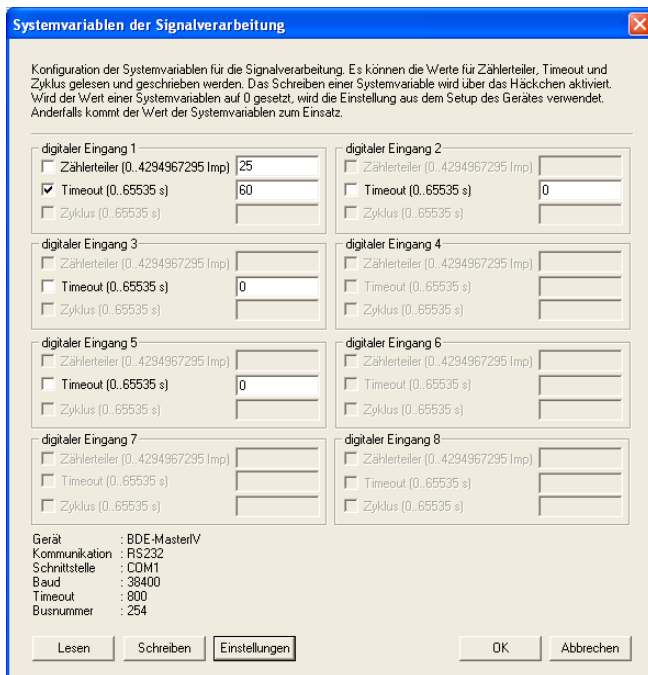


Figure 81: Dialogue system variables of the signal processing

By clicking on "Read" you can read out the counter divisor, timeouts and cycles of the digital inputs.

Then, you can change the information by ticking it and apply it to the device firmware by clicking on "Write".

You should note that, if the value of a system variable is set on "0", the settings from the setup of the BDE-MasterIV are used. Otherwise, the entered value.

4.5.10 Display state of the ZK-modules

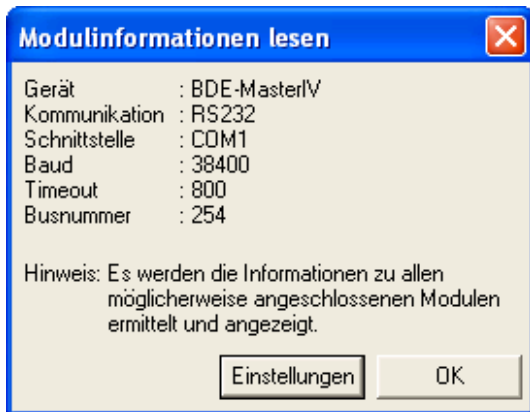


Figure 82: Read state of the ZK-modules

Via this function it is possible to receive detailed information about the state of the access control modules. You can check, which modules of the access control have been recognized by the terminal and which state they have.



Figure 83: State of ZK-module

TM stands for Türmodul (door module), followed by the three-figure bus number. In the list the maximum number of modules that can be connected to the BDE-MasterIV is shown. The next number indicates the state of the module. In the next column the type of the module is shown, L stands for Leser (reader), TM for Türmodul (door module) and LTM for Leser mit Türmodulfunktion (reader with door module function). The lower field contains a small legend of the status messages.

4.5.11 Work through batches

Via the function < *Kommunikation* => *Stapel abarbeiten* > the functions read data, delete data, set time, load setup, load lists and load access lists can be worked through chronologically. Further functions proceed automatically.

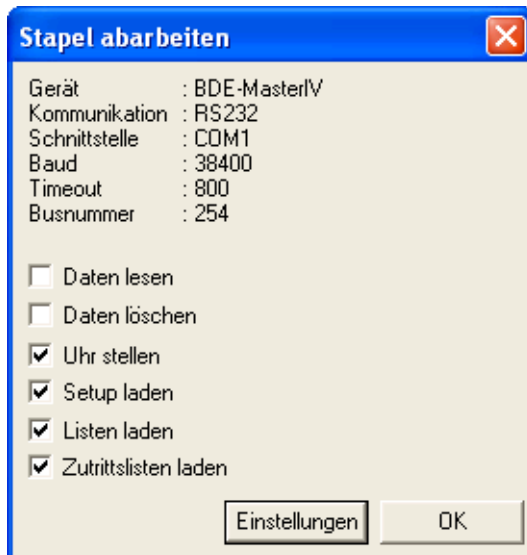


Figure 84: Work through batches

Depending on the activation/deactivation the respective functions are worked through.

After working through a reply for each activated function occurs.

Pay attention to the selection of the related setup if you have activated the option "Listen laden" (load lists). If you have not opened the right setup an error in the list processing occurs. All other options are executed faultless.

4.5.12 GPRS configuration

Corresponding to the data of your provider you can create a *.ini file for the GPRS configuration. The parameters that are necessary for the configuration of a GPRS/GSM connection are provided in the Ini-file. The Ini-file has the following structure:

```
; Standard values for GPRS modem (MC35i)
[MODEM_MC35i]

; Phone no. for dial-in
; _____
; T-Mobile, Vodafone, O2, E-Plus
PHONE = ""*99***1#"

; Access Point Name
; _____
; t-mobile GRPS = "internet.internet.t-mobile.de"
; vodafone GRPS = "web.vodafone.de"
; O2 GRPS = "internet"
; Contract customer
; E-Plus GRPS = "internet.eplus.de"
GRPS = "internet.internet.t-mobile.de"

; User name for internet dial-in
; _____
; t-mobile USER = "td1"
; vodafone USER = ""
; O2 USER = ""
; E-Plus USER = "eplus"
USER = "td1"

; Password for internet dial-in
; _____
; t-mobile PASSWORD = ""
; vodafone PASSWORD = ""
; O2 PASSWORD = ""
; E-Plus PASSWORD = "gprs"
PASSWORD = "gprs"

; Target configuration (port)
; _____
PORT = 80

; Target configuration (path)
; _____
HTTPSEND = "GET /oem/gprs/getdata.php?"

; Period of time between 2 alive-data records ALIVE = 300

; Period of time till the response of the server, otherwise disconnection
HTTPTIMEOUT = 15000

; Protokoll-Typ
HTTPTYPE = 1.1

; Target configuration (server)
; _____
; Target-IP or host name
; HOST = "192.168.0.1"
HOST = "www.datafox.de"
```

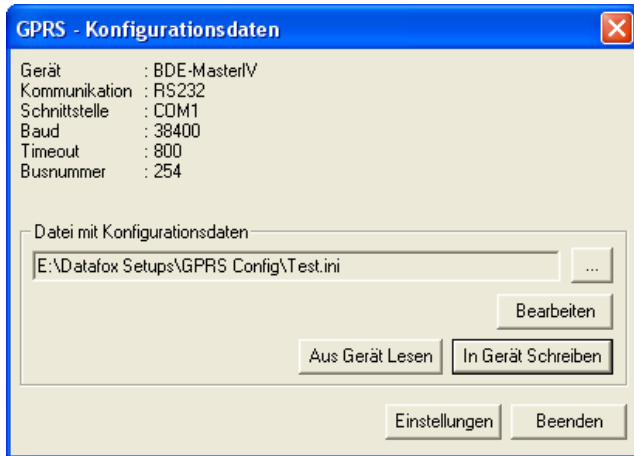



Figure 85: GPRS configuration

Via the GPRS configuration in the menu "Communication" you can read out the GPRS configuration data from a device, edit them and write them to a device or you can open an INI-file from your PC and edit it.

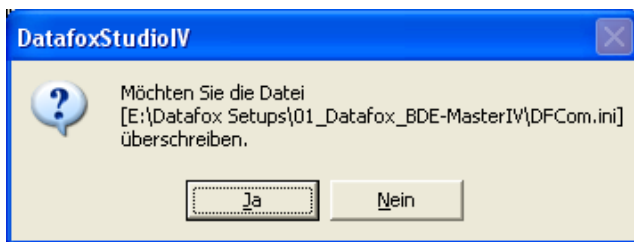


Figure 86: Overwrite configuration data

When you read out the data from a device, you have to set whether you want to overwrite the current file or write them to a now or another file.

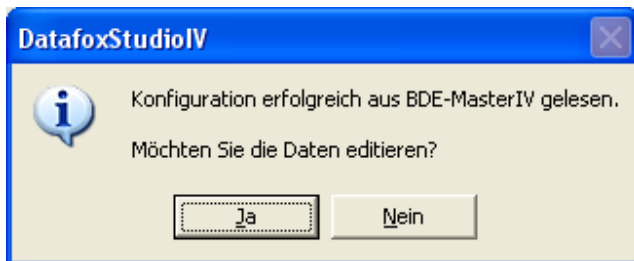


Figure 87: Reading of the GPRS configuration data

When the GPRS configuration was successfully read out from the device, you can select whether the data should be edited or be saved in the set INI-file.

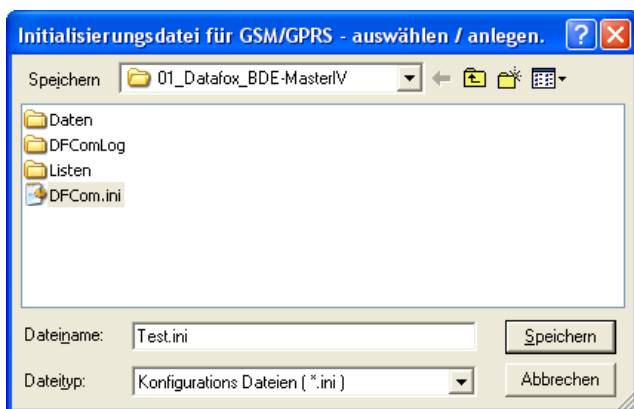


Figure 88: GPRS initialization file

If you have confirmed the dialogue in figure 86 with No, you have to select another file or enter a name if a new file shall be created.

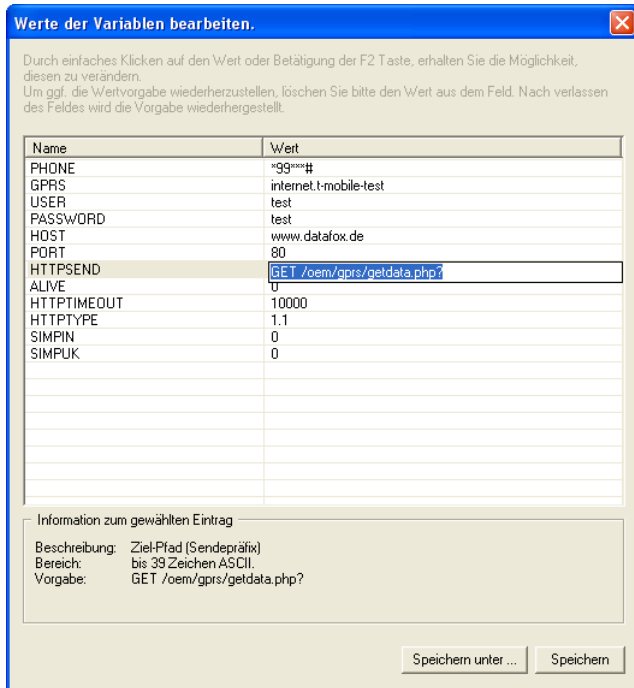


Figure 89: GPRS initialization parameter

In this dialogue you can edit the initialization parameter. Mark the line you want to edit by clicking on it. When the line is highlighted in blue, you can click on the selected parameter in the right column. An edit field opens where you can enter a new value. Additionally you receive information about the parameter. When all settings have been checked, the changes can be saved in the INI-file. Via the button *Speichern unter...* you can create a new initialization file.

When you have saved the data you can transmit them to the device via the dialogue in figure 85 with the button "Write in device". After the transmission you receive a status message.

4.5.13 Device configuration BIOS

The function $\langle \text{Kommunikation} \Rightarrow \text{Ger}^{\text{atekonfiguration}}(\text{Bios}) \rangle$ is relevant for Datafox devices that have no display. For this reason this function will not be explained here further.

4.5.14 Settings

Via the function $\langle \text{Kommunikation} \Rightarrow \text{Einstellungen} \rangle$ you can select the parameter for a communication between a PC and the BDE-MasterIV. For all communications applies: at first select the device type. It can be set optionally whether only error messages should be output or whether the accessibility, should be checked via Ping before establishing a connection.

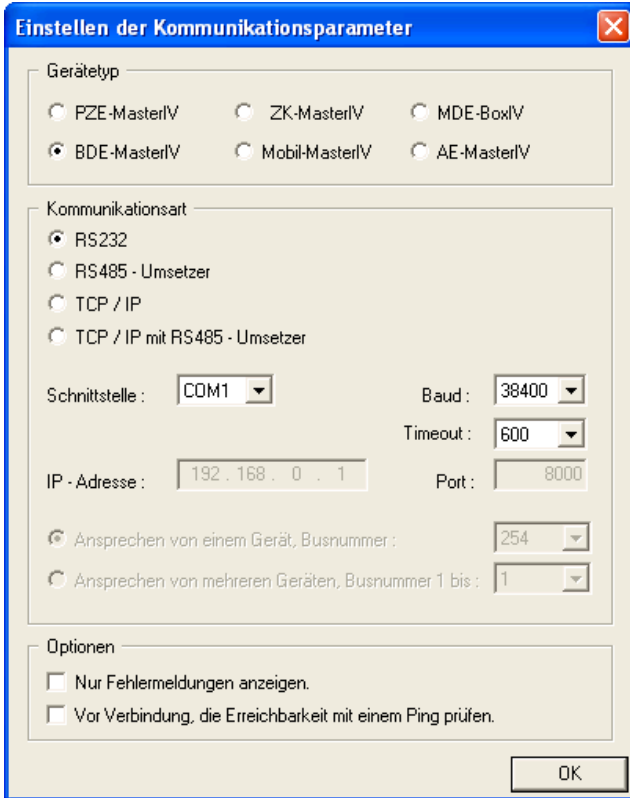


Figure 90: Settings of the RS232 communication

With the type of communication you set via which channel (transmitting medium) the communication should take place.

Dependent on the selected communication, the active parameter have to be set.

In case of RS232 the serial port (COM-Port), the baud rate (how many bits are transmitted within a second) and the timeout (time till the connection termination if no data arrive) have to be set.

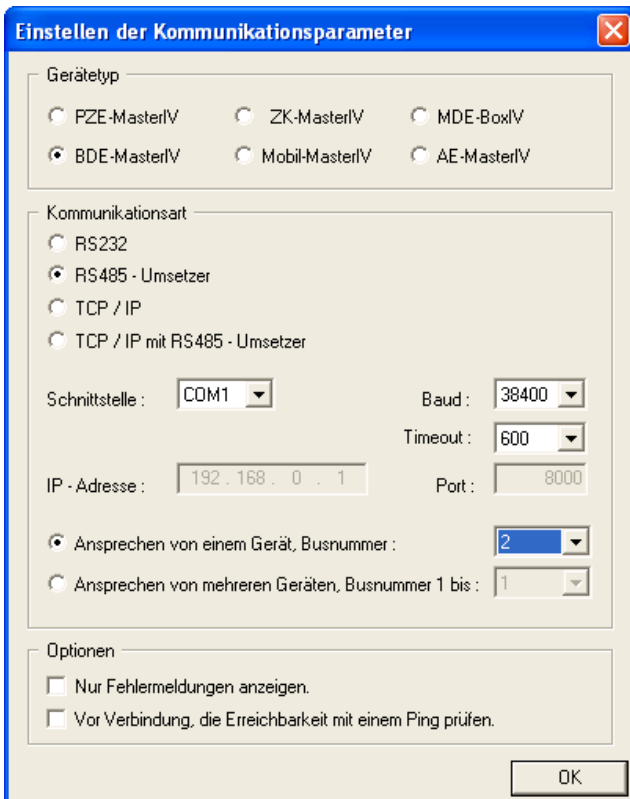
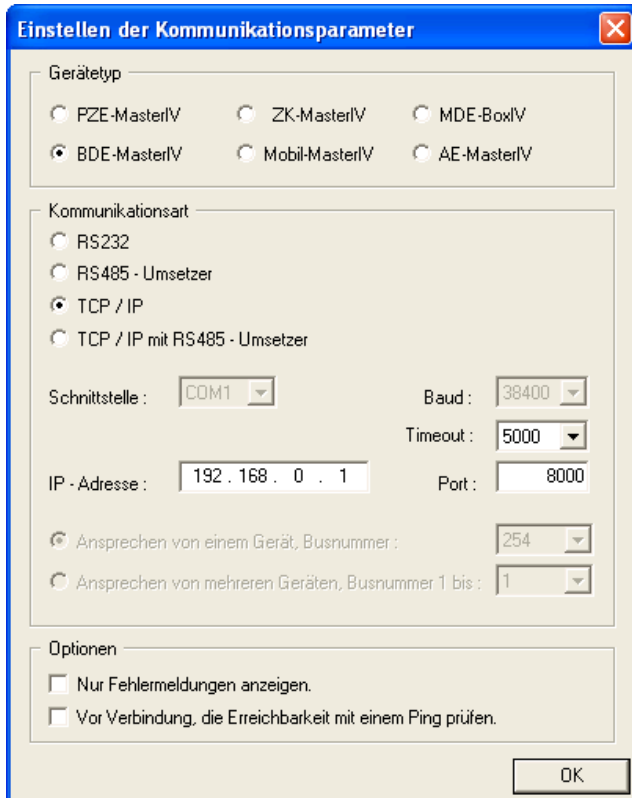


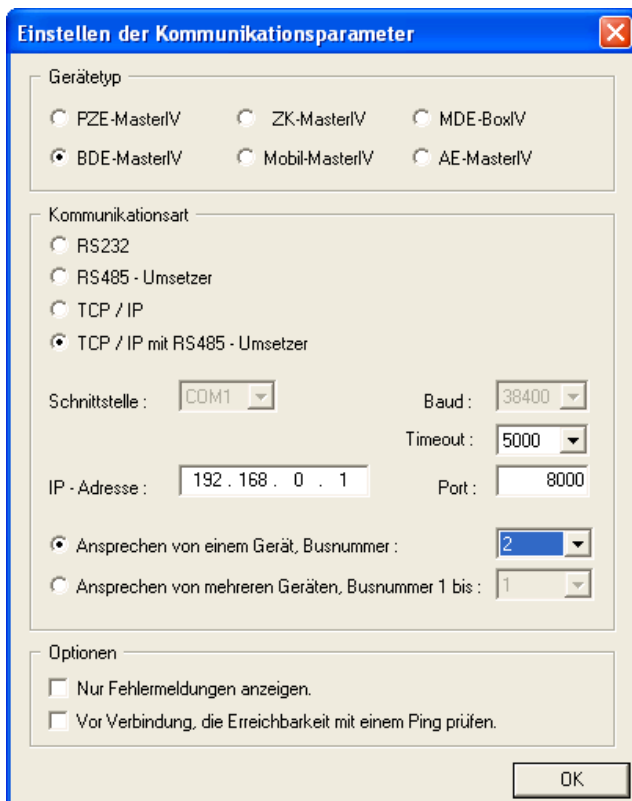
Figure 91: Settings of the RS485 communication via converter

For a communication via a RS485 converter, in addition to the information of the RS232 communication you have to set if one or several devices should be activated. For a communication with only one device the bus number of the device is set (see system menu bios in chapter 3.5.1). Several devices can only be activated in a consecutive order of bus numbers, starting with bus number 1, and by giving the bus number of the last device.



At a communication via TCO/IO the IP address of the BDE-MasterIV, the communication port and the timeout (in msec) have to be set.

Figure 92: Settings of the TCP/IP communication



In this case, analogous to a communication via TCP/IP the parameter have to be set and additionally it has to be set if one or several devices should be activated. For a communication with only one device the bus number of the device is selected. Several devices can only be activated in a consecutive order of bus numbers, starting with bus number 1, and by giving the bus number of the last device.

Figure 93: Settings of the TCP/IP communication via RS485 converter

4.6 Menu Extra



Note:

You can and should check all displayed communication parameters at each dialogue that opens with one of the following function calls, and adjust them via the button Settings if necessary.

5 DatafoxStudiIV - Setup

5.1 Basics

5.1.1 Planning

Before switching on the computer and creating the setup, the process of data collection and the setup structure should be planned. Only a few steps are necessary to do that. If you do the preparations carefully you can create the setup very fast.

On the graphic you can see the connections between parameterisation and result data. You may find secondary project support in the form of models on the Datafox CD.

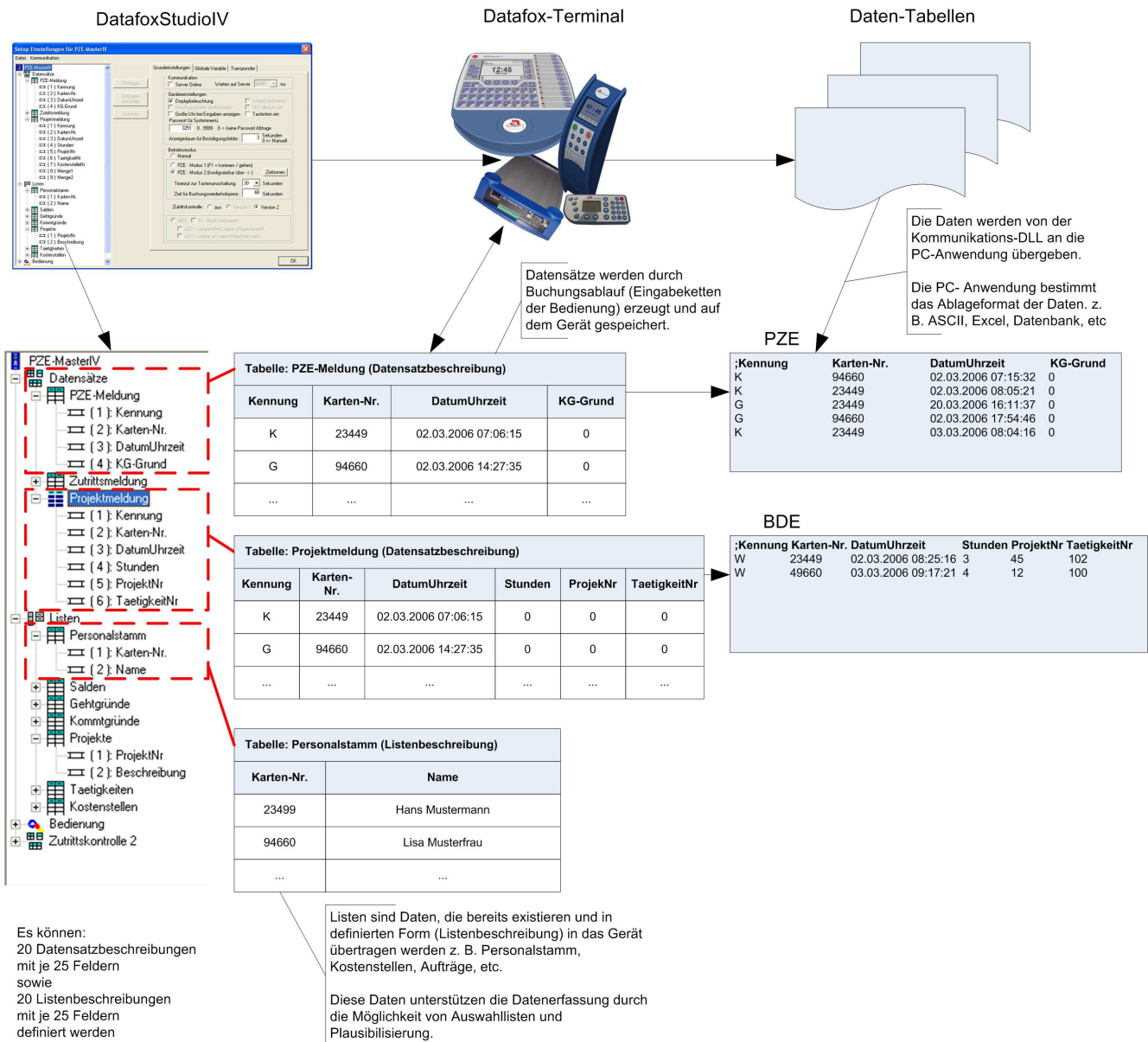


Figure 94: System relations

Planning steps

- ▶ Define all the tables for the data records that should be collected:
field order, field name, field format
- ▶ Set the method of data collection for each field of a data record. In order to do this please use the operation (input chain fields):
bar code, transponder, list, entering via keys, constants, global variables, etc. Combinations are possible
- ▶ In order to use lists you have to define this lists analogous to the data record descriptions:
field order, field name, field format
- ▶ The most important step is the planning of the booking processes (input chains of the operation).
To this step belong questions like this:
 - What is the best order to enter the fields?
 - Are loops or jumps labels necessary?
 - Are global variables necessary?
 - Are depending lists necessary? E.g. projects with specific occupations; if the project is selected, only the appropriate occupations can be chosen
 - Should the device switch off automatically after entering a data record?
 - ...




Note:

If the tree structure is very large, it might be arduous to open all the structures by clicking on it with the mouse. By using the following key combinations the tree structure also can be operated.

Shortcut	Funcion
* (on the keypad)	display all secondary files under the current selection
+ (on the keypad)	display the secondary files under the current selection
- (on the keypad)	fade out the secondary files of the current selection
↓	move down one position in the opened tree
↑	move up one position in the opened tree
→	open the following application level in a branch
←	close the complete branch

5.2 Functions of a setup

5.2.1 Basic settings



Note:

With the DatafoxStudioIV more than one device type can be configured. The functionality of the devices differs. Therefore it is important to select the device type at first. Only then it can be guaranteed that all functions are available while configuring and that they are not deactivated.

Depending on the chosen communication type some further settings have to be carried out. Please note, that all changes have to go well with the settings of the device (see chapter 4.5.14).

After setting the type of device and communication the basic settings, the global variables and the transponder settings of the device can be defined.

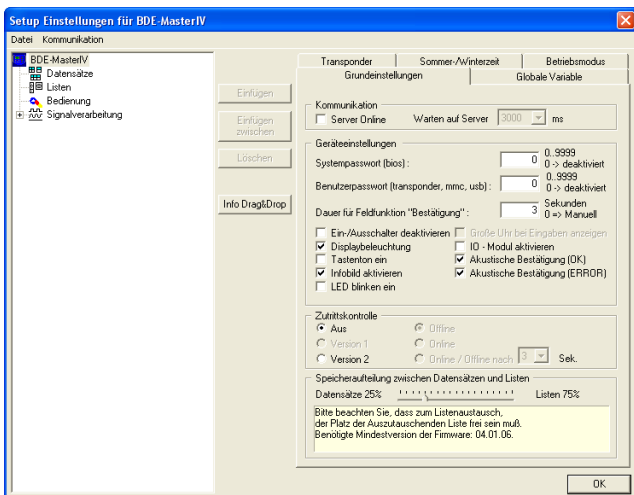


Figure 95: Basic settings depending on the device

Activating the online operation is combined with a wait (input lock) after each input (booking record), for the set period of time in ms.

Under Device settings (2) the display and the acoustics are defined. In order to secure the configuration, you can set up a password for the system menu-BIOS (see chapter 3.5.1 Bios).

The operating mode (3) controls the reactions when you enter something. If Normal is selected, the device dwells on the key that was pressed last. When PZE-Mode 1 is selected, the device returns to the F1-key after the set period of time (timeout for keyboard shift). The anti-repeat lock for bookings indicates, that a card is read only once within the set period of time. The PZE-Mode 2 has to be configured via the time zones additionally.

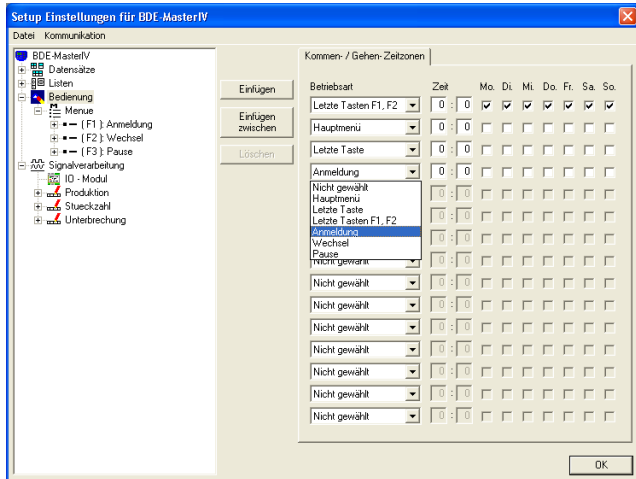


Figure 96: Definition of time zones

This configuration cannot take place before the definition of the operation is finished.

The input chains (assigned under operating mode, with setting of time and activation of weekdays) are not available till then.

Via the time zones the following reactions can be defined:

- 1.) The device is in operation, but no booking record is carried out over a longer period of time. All 60 seconds the device checks the current operating mode (time and weekday) and sets itself to that state.
- 2.) When a key is pressed, e.g. when calling up staff accounts, and the timeout is run out, the device returns to the state defined via the time zones. This can be the main menu, the last key, the last key F1-F2 or an input chain.
- 3.) When a booking record was finished after pressing the ↵-key, the device returns to the state defined via the time zones forthwith.

By activating the access control version 2 a new element is created in the tree structure, so that the access control can be configured.

From version 04.01.06. x can be put how much of the device memory should be used for records and how much for lists.

5.2.2 Global variables

Global variables are used as buffers within the device and do not depend on a data type. That way it is possible to transmit values, created within an input chain, to another input chain for reprocessing. At most 8 global variables can be defined in the BDE-MasterIV.

Already while defining, the global variables can be preallocated with values (in the basic settings of the device via the register card Global variables, see figure 97). It is also possible to fill them with values via input chains within the term. If you access to the same GV repeated, writing, via input chains, the value of the GV is changed.

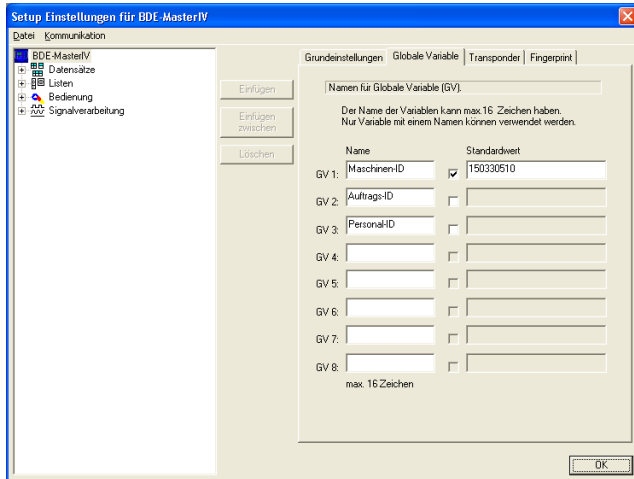


Figure 97: Setting of global variables

The use of global variables is explained in detail in chapter 5.3.

For testing purposes or also with the basic parameters (e.g. device-no.) it might be very useful, if the global variables are already preallocated in the setup.

When a global variable is filled via an input chain you have to differ to cases: Either you fill the GV and create a data record concurrently, or you fill the GV without creating a data record. In the second case please note, that there should be no connection to any data record description.

When inputting GVs using the function Normal, you can carry out a format check via the register card Expanded. Such a test is not available for other input functions. That is not necessary, because there the data formats are set in advance.

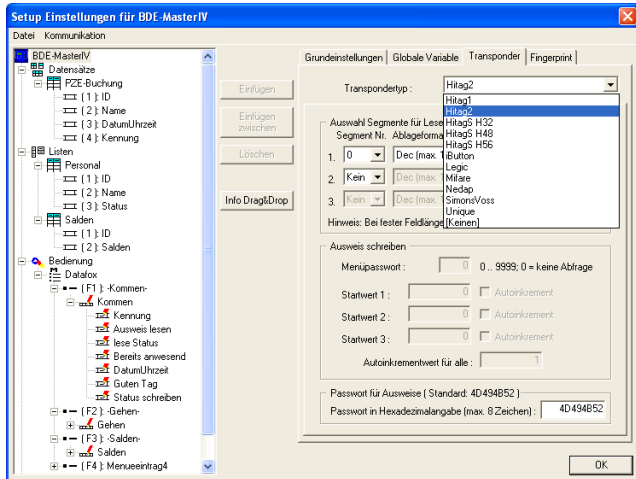


Note:

- When you transmit a new setup, it is possible to delete global variables and their values. In order to do this you have to activate the appropriate option.
- If you want to reset one or all GVs to a defined value (e.g. at clocking-off), you have to create an input chain with the appropriate fields. Use the function Constant. Via the configuration of the time zones you can set, when this input chain resets the GVs.

5.2.3 Transponder

Transponder readers are provided in two versions. Either it is integrated into the device or you get an external module, e.g. TS-TMR33. Whether the appropriate option is available, you can see on the type label and in the device menu (press ESC+F1 to get there). In order to release the transponder reader you have to open the setup and to set the appropriate options (see figure 98).



When configuring the transponder please mind the provided information about the current transponder type.

The reading system is set via the transponder type.

Figure 98: Settings of the transponder

At the moment the following transponders are supported by the BDE-MasterIV Fields on the transponder				
Frequency	Type	Module	Fields on the transponder	Comment
125 KHz	Unique	TMR33,	Fixed 13-digit number	Only reading possible
125 KHz	Hitag1	ProxLine MCR, PHG-Voxio oder -Relino	64 segments each 4 byte: 0 = Fixed number, only reading 1 to 31 = Passwords, 32 to 63 = available.	The available segments can be used e.g. to save a firm identification, a card number, an account for canteens etc. PHG supports at most 3 segments with Hitag1 and 2, with Titan only the serial number.
125 KHz	Hitag2	(Switch over in DatafoxStudioIV)	8 segments each 4 byte: 0 = Fixed number, only reading 1 to 3 = Passwords, 4 to 8 available.	
125 KHz	HitagS		1 - 63 available	
125 KHz	Titan EM4450		34 segmentes: 0 to 2 = Password 3 to 31 = available 32 to 33 Serial/Device ID	
13,56 MHz	Mifare	Mifare, PHG-Voxio oder -Relino	16 segments available	The high speed and the large memory capacity are also favourable. So this transponders are very suitable for biometry.
13,56 MHz	Legic	Primo, PHG-Voxio oder -Relino		
125 KHz	SimonsVoss	SimonsVoss	10-digital Number 1 to 5 = System number 6 to 10 = Key	Up to 8000 identity cards (plus profile) can be saved on one SmartRelais.
—	iButton	iButton	Fixed 15-digital Number	

Table 21: Overview over supported transponders

Various possibilities of configuration are available for the DatafoxStudioIV, depending on the chosen transponder type.

5.2.3.1 Transponder reading systems

Read		
Type	Frequency	Module
Unique	125 kHz	TSR20, TSR21, TSR30, TSR32, TSR33
Hitag1	125 kHz	TSR21, TSR32, TSR33
Hitag2	125 kHz	TSR20, TSR21, TSR30, TSR32, TSR33
HitagS H32	125 kHz	TSR21, TSR32, TSR33
HitagS H48	125 kHz	TSR21, TSR32, TSR33
HitagS H56	125 kHz	TSR21, TSR32, TSR33
Titan EM4450	125 kHz	TSR20, TSR21, TSR30, TSR32, TSR33
Mifare	13,56 MHz	Mifare
Legic	13,56 MHz	Primo
iButton	—	Dallas Semiconductor DS9092
SimonsVoss	25 kHz	SimonsVoss
PHG	125 kHz sowie 13,56 MHz	Aperio, Relino

Table 22: Transponder read

Write		
Type	Frequency	Module
Hitag1	125 kHz	TSR32
Hitag2	125 kHz	TSR30, TSR32
HitagS H32	125 kHz	TSR32
HitagS H48	125 kHz	TSR32
HitagS H56	125 kHz	TSR32
Titan EM 4450	125 kHz	TSR30, TSR32
Mifare	13,56 MHz	Mifare

Table 23: Transponder write

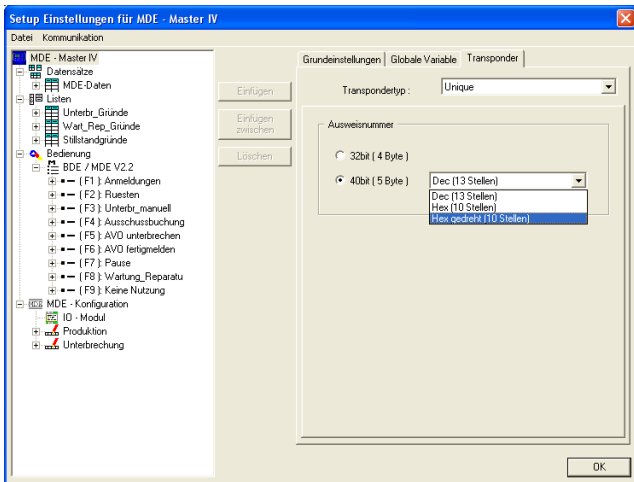
TMR33 supported by GIS:

- Unique (Serial number)
- Hitag1 (max. 3 segments)
- Hitag S H32 (max. 1 segments)
- Hitag S H48 (max. 3 segments)
- Hitag S H56 (max. 3 segments)
- Hitag2 (max. 3 segments)
- EM4450 (max. 3 segments)

Please note the following when using Mifare:

The value-format is not supported.
 You can only read the data-format with the key-A.
 You can read and write the default-format with key-A.

Unique



Unique is a pure reading system. The card number is a worldwide well-defined ID and is used in all conceivable fields. A 64bit information is saved on the card. For the well-defined ID only 40bits are used. The remaining bits are amongst other things used for a checksum. When using Unique in DatafoxStudioIV the value of the card number (ID) (as 40 or 32bit-value) can be used for further processing.

Figure 99: Unique transponder

Hitag1

Hitag1 is organized in 16 blocks at 4 segments each. Each segment has a length of 32 bits. The block numbers 4 to 7 can be saved with a password (secret) or used without one (public) optionally.

!

Caution:
 DatafoxStudioIV supports only the segments 0 and 8..63. The segments of 32..63 can be read and written always, the segment 0 can be read always. Depending on the content of the segments 1..7 it might be possible, that the segments 8..31 cannot be read or written.

For the writing of the cards an initial value per each segment can be set. You can activate the option Autoincrement value behind the current initial value. Then the current segment value is increased by the value indicated under Autoincrement value after every write operation. The initial values of the segments

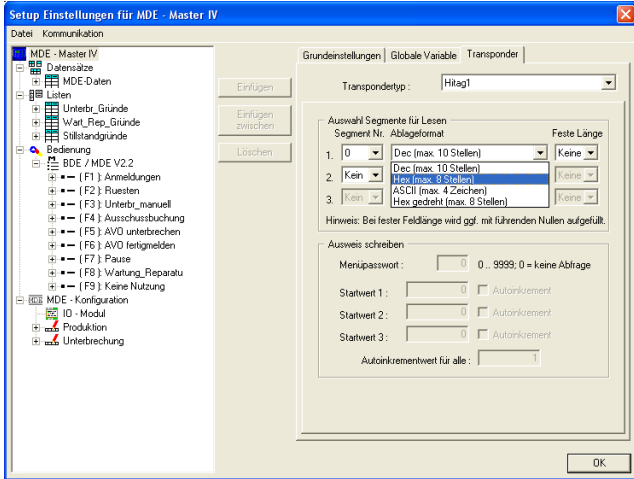


Figure 100: Hitag1 transponder

At most 3 segments are available for concurrent processing. You can select them in the DatafoxStudioIV under Transponder via the segment number.

Via the filing format you set how the 32bit-value is used.

When you select Fixed length the read card value is cut to the set number of digits and is filled up with zeros (0) left-sided, if necessary.

can be edited in the device-BIOS. The set autoincrement value is only displayed in the device-BIOS and cannot be changed on the device itself. The writing of cards can be saved by a menu password.

Hitag2

Hitag 2 is organized in 8 segments. Each segment is 32 bits long.

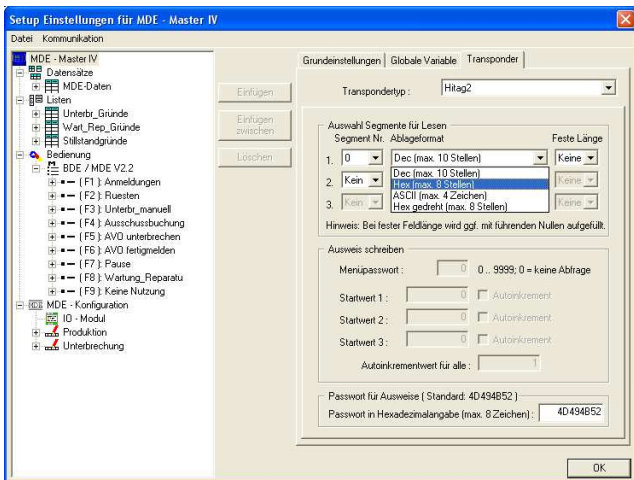


Figure 101: Hitag2 transponder

At most 3 segments are available for concurrent processing. You can select them in the DatafoxStudioIV under Transponder via the segment number.

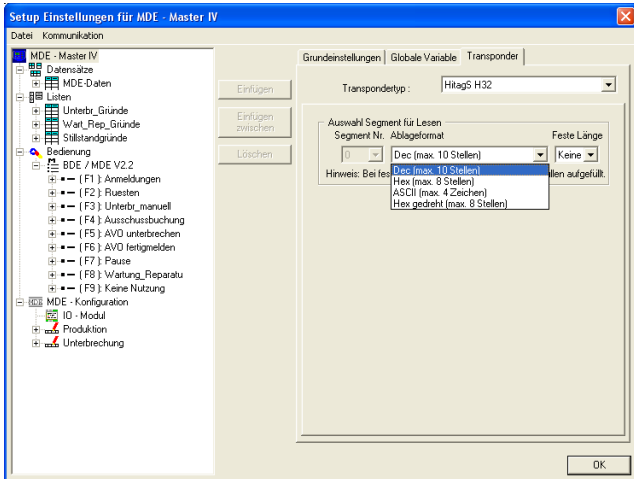
Via the filing format you set how the 32bit-value is used.

When you select Fixed length the read card value is cut to the set number of digits and is filled up with zeros (0) left-sided, if necessary.

For the writing of the cards an initial value per each segment can be set. You can activate the option Autoincrement value behind the current initial value. Then the current segment value is increased by the value indicated under Autoincrement value after every write operation. The initial values of the segments can be edited in the device-BIOS. The set autoincrement value is only displayed in the device-BIOS and cannot be changed on the device itself. The writing of cards can be saved by a menu password.

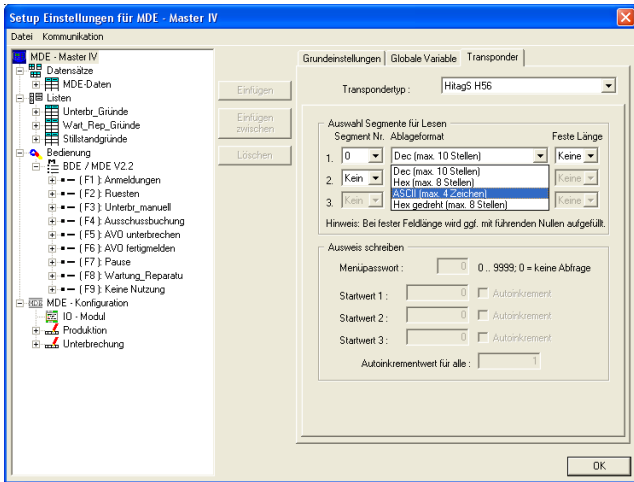
HitagS

When using this method you differ between "HitagS H32", "HitagS H56" and "HitagS H48".



HitagS H32 means, that this transponder has just a 32bit-value (= serial number of the card) (see Unique).

Figure 102: HitagS H32



The H56 means, that this transponder has 8 registers for a 32bit-value each, altogether 256 bit (see Hitag2).

Figure 103: HitagS H56

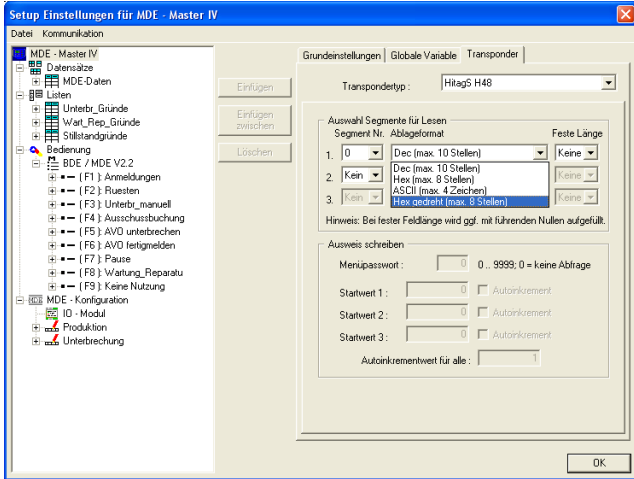


Figure 104: HitagS H48

The H48 means, that this transponder has 64 registers for a 32bit-value each, altogether 2048 bit (see Hitag1).

Titan

Titan (EM4450) is organized in 34 segments. Each segment has a length of 64 bits. You can find the serial number in segment 32.

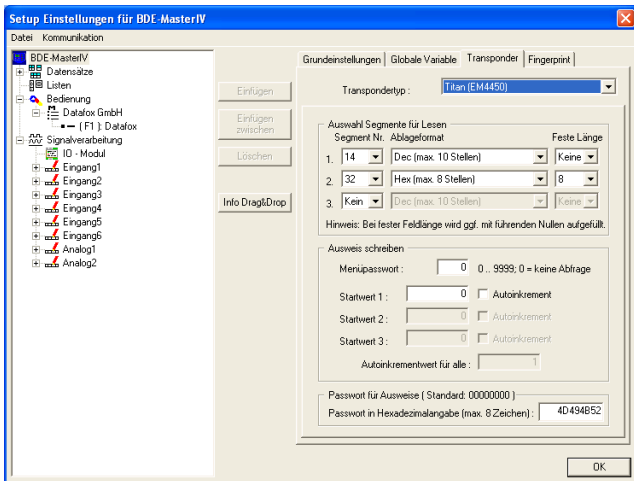


Figure 105: Titan EM4450 transponder

At most 3 segments are available for concurrent processing. You can select them in the DatafoxStudioIV under Transponder via the segment number.

With the filing format you set, how the 64bit-value is used.

When you select Fixed length, the read card value is cut to the set number of digits and is filled up with zeros (0) left-sided, if necessary.

For the writing of the cards an initial value per each segment can be set. You can activate the option Autoincrement value behind the current initial value. Then the current segment value is increased by the value indicated under Autoincrement value after every write operation. The initial values of the segments can be edited in the device-BIOS. The set autoincrement value is only displayed in the device-BIOS and cannot be changed on the device itself. The writing of cards can be saved by a menu password.

Mifare

Mifare is organized in 16 sectors at 4 blocks each (each per 16 Byte). Each fourth block is used to encrypt the data on the transponder. It is partitioned into a key-A and a key-B and contains a password (each 6 byte long) for write- and read permission as well as the access condition, the media types are defined in. Depending on the application, all blocks of a sector can be available either in default-format (i.e. the key-A is the read- and write protection key) or in data- or rather value-format (i.e. the key-A is the reading password and the key-B is the master key for reading and writing). At the moment the Datafox devices (up to version 4.1.4.xx) support only the default-format.

Legic

Legic is used only in the German speaking areas. Both spanned and unspanned memory cards are provided. On the unspanned memory card the data are read by means of position- and length indication. It is impossible to write on such memory cards.

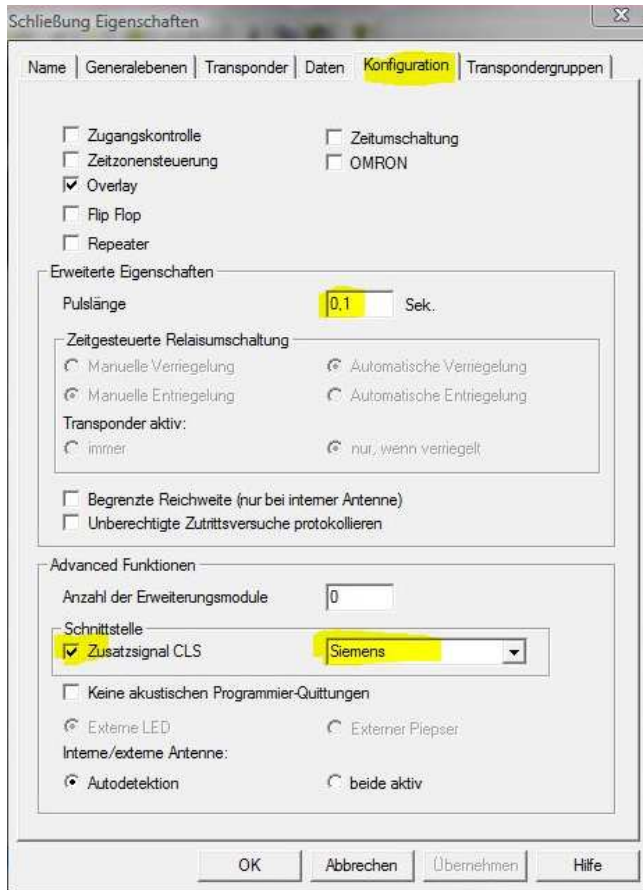
On the spanned memory cards you have to set not only the length but also the segment, the data are read from.

iButton

iButton is a contact reading system. The iButton has only a serial number, which is read, when a contact between iButton and transponder takes place.

SimonsVoss

SimonsVoss is an active contact-free reading system. Each card has a well-defined 10-digit decimal code. The digit 1-5 is the firm identification, digit 6-10 the card number.



Under Configuration (the SimonsVoss administration software for setting up the locking system) you have to set the following:

- 1.) In the field of the interface please select Siemens and activate the option Supplementary signal CLS.
- 2.) Now please cut off the terminal from the power supply and restart.
- 3.) In the field of the expanded characteristics please set a pulse rate of 0,1 seconds.

Figure 106: SimonsVoss Einstellungen

You may find further information on the Datafox CD under
 ..\Datafox Optionen\SimonsVoss Leser freischalten\OZ 10 Anleitung Freischalten SimonsVoss-Leser.pdf

5.2.3.2 Function upgrading for Mifare transponders

5.2.3.2.1 General information

The function Autologin always works in this version. If no password is entered, the default password by Philips or Infineon is used. If a password is entered, at first a login as key A is carried out and if that fails, this password is used as key B. Autologin is active only for reading.

5.2.3.2.2 Global settings

Mifare

Three password groups are provided. Password group 1 is used for the global settings. Range 2 is freely available, range 3 can be used with the restriction, that here the passwords of the old card (for rewriting the Access Conditions Bits of the sector trailer in the BIOS menu) are logged.

For the ASCII-format the value with the given length is written on the card, a zero-termination is not written on the card. If there are any zeros within the given length, they are written on the card.

For the ASCII-format the value with the given length is read from the card, a zero-termination is added after the given length. Thus, the maximum length, possible for the card, used completely.

All Mifare standard cards can be used. When using 1kByte cards all sectors can be used, when using 4kByte cards only the first 16 sectors (out of 40) can be used.

Autologin function

In the previous version 04.01.04.xx the Autologin was active non-stop; only a few users knew this and used it. In the version 04.01.05.19 (and higher) the Autologin works in a different way. At activation all 6 passwords, that are given, are used until a login was successful. This function allows only the reading of the card with various passwords; when writing on the card the password has to be correct. If Access is used, the Autologin function cannot be used, because the access reader permits only one reading password for security reasons.

Access Conditions Bits

The Access Conditions Bits are logged on the sector trailer, the fourth block of a sector. Each sector can have its own password key A and B, also the access rights can be set for each sector and even for each block. The sector Trailer is structured as follows:

The sector Trailer cannot be read out via the setup functions. Only the blocks 0 to 2 are accessible in order to read and write data. The Access Conditions indicate the block format and the access rights of the block of a sector. The Value format is not supported by the firmware, but this can be set optionally. You should pay special attention to the Access Condition (B3), because the settings of the sector Trailer cannot be changed afterwards, it is write-protected then. If you are not sure, you should use the default settings of the producer.



Caution:

The Access Conditions Bits do not change the settings of the password use in the groups 1, 2 or 3. Here you have to pay attention, so that the settings correspond to the ACB. A set write-protection of the sector Trailer cannot be cancelled.

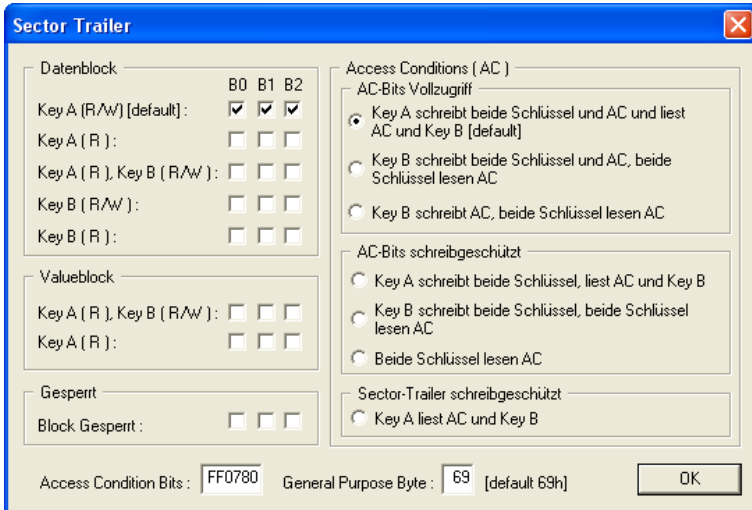


Figure 107: Sektor Trailer

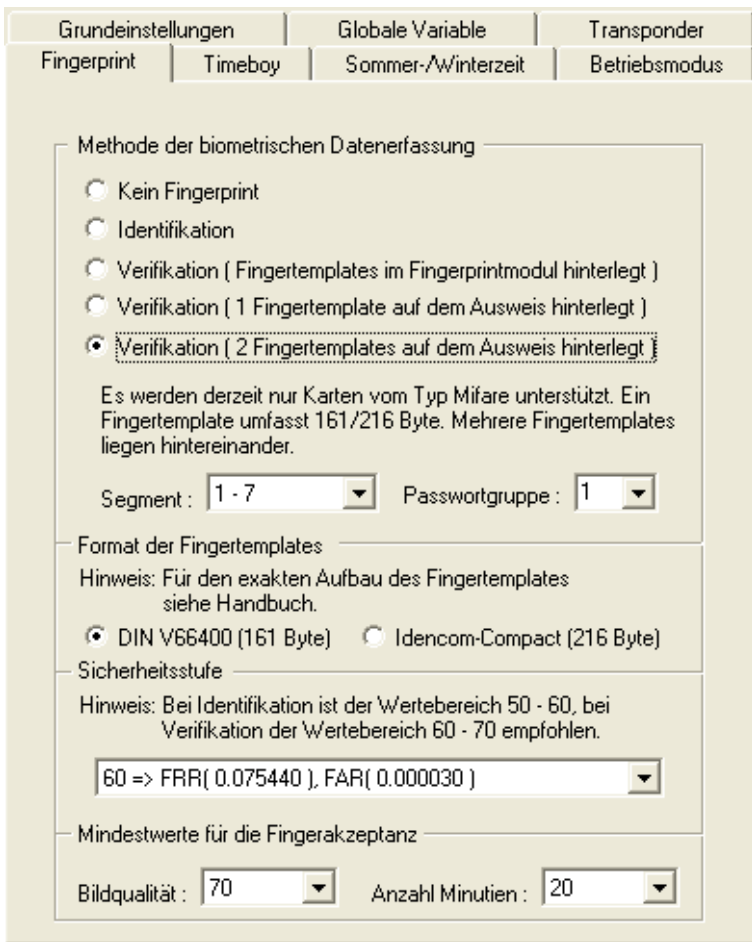
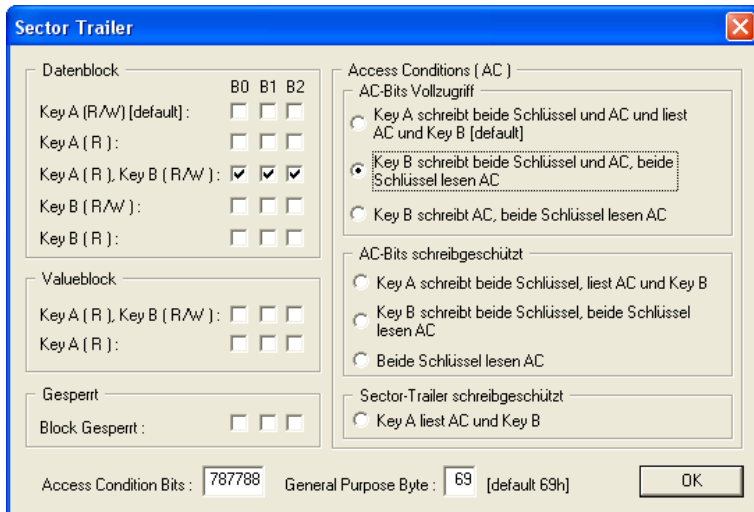


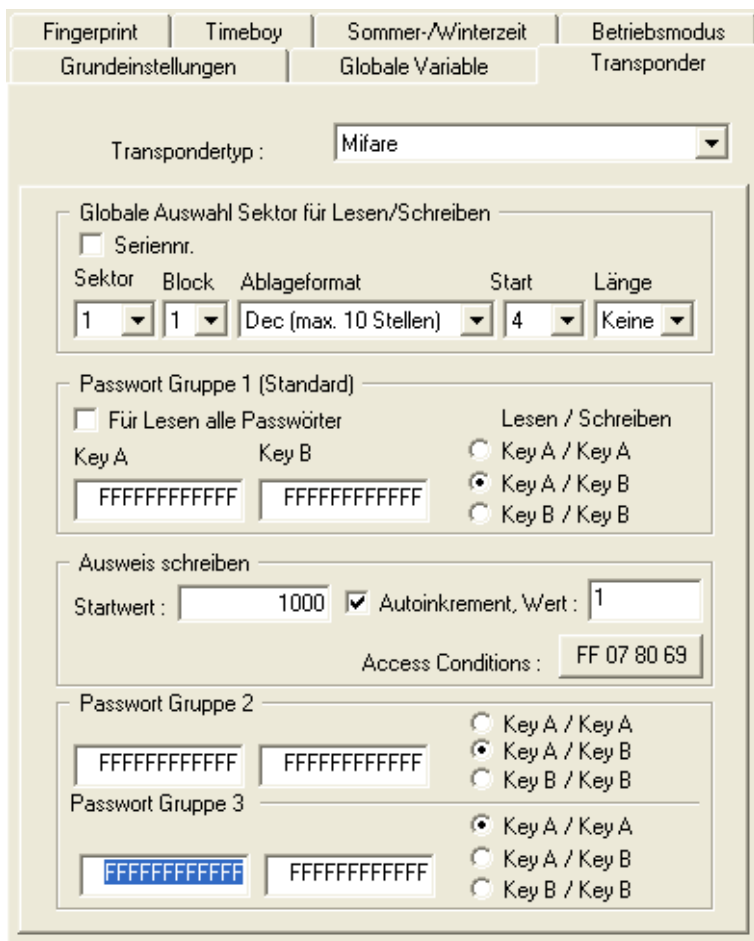
Figure 108: Example of a card

The card with the set default password key A FFFFFFFFFFFFFFFF for reading and writing with the ACBs FF078069 is new.. The card should have an ID number (32-bit as decimal value with leading zeroes, 10 digits) in the range sector 1 block 1, and a data range for fingerprint in the sectors 2 to 10. The range for the ID number uses the password group 1 with key A (reading key) and key B (writing key); the range for the fingerprint uses the password group 2, also with key A (reading key) and key B (writing key). In that case the ACBs have to be changed.



The ACBs (Access Condition Bits) should have a value of 78778869.

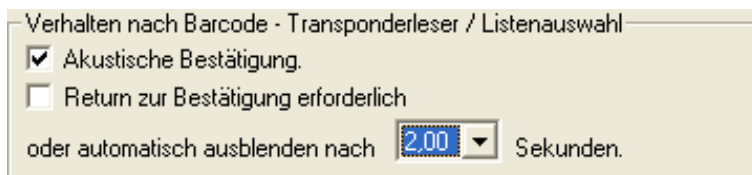
Figure 109: Sektor Trailer



In order to set the card on the values, intended for the use in the setup, the password group 3 has to contain the old passwords; in this example key A with FFFFFFFF as reading and writing key. Via the transponder menu the card can be set newly, but the formatting sector has to be activated. The ID can be set via Write data on card, the field Fingerprint via Fingerprint sector trailer. Now the card possesses different reading and writing passwords for fingerprint and ID, that are only known to you and the terminal.

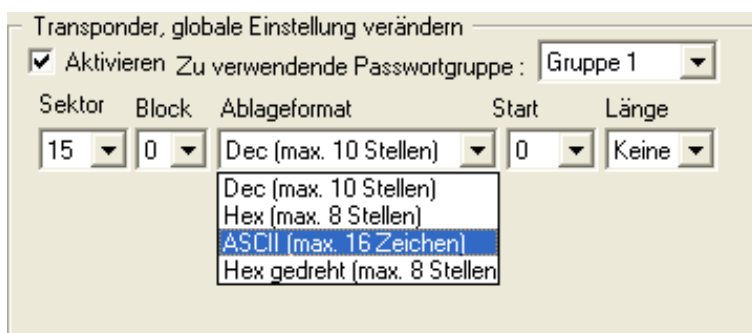
Figure 110: Password definition

5.2.3.2.3 Function normal



New for this field function is the switching-on and -off of the acoustic signalisation. The background is, that the last access to the transponder shall create a beep, in case of carrying out several reading and writing processes within one input chain.

Figure 111: Behaviour after Barcode - transponder reader



On the field Mifare some alterations were carried out, so that now not only an ASCII string can be read, but also binary values (as already possible at other transponder processes). It is important, that the password group is set correctly, so that the data can be read.

Figure 112: Behaviour after Barcode - transponder reader

5.2.3.2.4 Transponder value write, also for Hitag1, Hitag2 and Titan

Only values of global variables can be written.

Note for the user: With Hitag several segments can be used. If these segments use different formats, the number of digits has to be set under Decimal (except for the use of only one segment). Otherwise, the data might be written on an other range than desired.

The page Expanded has the same structure as the one for field function Normal.

5.2.3.2.5 Transponder menu

The transponder menu is different only on the register card Mifare. The function Formatting sector was added to the hitherto existing functions/ menu items. The activation of this new function causes, that a card with key Ax and key Bx and its current ACBs is overwritten with the values of key A and key B of field 1 and with the ACBs of block 4, set in the setup. In order to carry out a login with the correct passwords, key Ax and key Bx have to be set in the password group 3. All this is important, if you want to create a new password for a card, that is new/ unused or even already used.

Terminals with fingerprint If the terminal is equipped with fingerprint and Mifare, the menu item "Fingerprint field sector trailer" is displayed in the transponder menu. Here the sectors, with the settings of the password section, edited under Fingerprint, are set. If Formatting sector is active, the passwords and the ACBs are set; if this option is deactivated, only the passwords are set. For the logging-in password the field 3 is used. The number of sectors, that are not accessible, is displayed at the end of the formatting

process. The reason for this are the different Access Conditions of the single sectors. Here the terminal will not help you. Such error sources have to be eliminated before, or you have to make sure, that the cards were not used yet. In that case such an error does not occur.

Conclusion If Formatting sector is deactivated, only the value is written on the card under Write card, on the fingerprint field Sector trailer only the passwords for the memory range of the fingerprint templates are set. If Formatting sector is activated, both passwords under Write card and block 4 of the segment with Access Conditions on the fingerprint field Sector Trailer are written newly. If the fields to be written are write-protected, an error message is displayed.

You may find further information about Mifare under <http://www.mifare.net/> or www.nxp.com Products => Identification => MIFARE => MIFARE Classic.

5.2.3.3 Application possibilities for Hitag-transponder

All Hitag-transponders have got a fixed serial number in segment 0 and further available segments. You may find information about number, size and function in table 21. There is the possibility to use different segments. So you have several possibilities to use them with PZE and ZK. In the following you may find 2 examples for the possible use of PZE and ZK as well as the advantages and disadvantages.



Note:

You recommend the safer method with lists in the terminal. When using ZK lists they are necessary anyway.

Example 1.

BDE-MasterIV setup for Hitag2 with firm code in segment 4 and personnel number in segment 5.

Operation:

The firm code is filed in segment 4. When reading the card a format check is carried out, e.g. 010101* for the customer ID 10101. The first 0 is created, because the fixed field length is 6. That means, even if the customer ID becomes a 6-digit number, the process still works.

The personnel number is filed in segment 5 (card number = personnel number).

Security is created by the firm code exclusively. Of course a further list could be loaded. But this would not be an improvement, because the clearness of the card number cannot be guaranteed.

The cards can be programmed via the terminal or the desktop reader TS-WR34_USB article-no. 222001

Advantages:

No permanent staff lists have to be transmitted to the terminal.

Disadvantages:

Overlappings might be possible, if the firm code is not well-defined. That can happen, if you forget to set the setup for the project or if another producer uses the same method. Different accounting programs use different formats for the customer ID. The setup has to be set customer-specific.

- ▶ Under Transponder the project number/customer ID has to be input.
- ▶ The format check has to be set in each input chain.

Each card has to be programmed.

Example 2.

BDE-MasterIV setup for Hitag 2 with card number in segment 0 and check on lists.

Operation:

Only the well-defined serial number (already programmed by the producer) in segment 0 is used.

Security is created by a check of the permanent staff lists (as standard with Unique).

Advantages:

The process is absolute safe because the well-defined serial number is used.

The setup does not need to be adjusted to each costumer, i.e. the same setup can be used for various projects/costumers.

The cards do not need to be programmed.

All free fields are available for other uses (canteen, drinks dispenser, firm equipment etc.).

While bookings are carried out, the name of the person can be displayed.

Disadvantages:

You have to load the lists, that should be controlled on the device compulsorily. (Alternative: This can also be done via an online check with the server application.)



Note:

Datafox offers a desktop reader with USB-connection to read the serial numbers into the PZE-software. By the keyboard emulation software the reader reacts like a keyboard. The cursor is put to the field Card number and the transponder is read. The number in the set segment is read and written to the position of the cursor.

5.2.4 Creating data record descriptions



Caution:

When creating data record descriptions please note the following restrictions:

- At most 25 data fields are admissible per each data record description.
- The field length of date and time is set in advance by the format fix.
- Numeric character fields and ASCII-fields with a firmware release smaller than 04.01.03 are limited to 20 characters, the following firmware versions can save up to 40 characters in the fields.
- The total length of a data record is limited to 230 byte.
- At most 20 data record descriptions can be created.

In order to name the new data record, click on it in the tree structure. On the right side the details about this data record are displayed. There you can enter the new name.

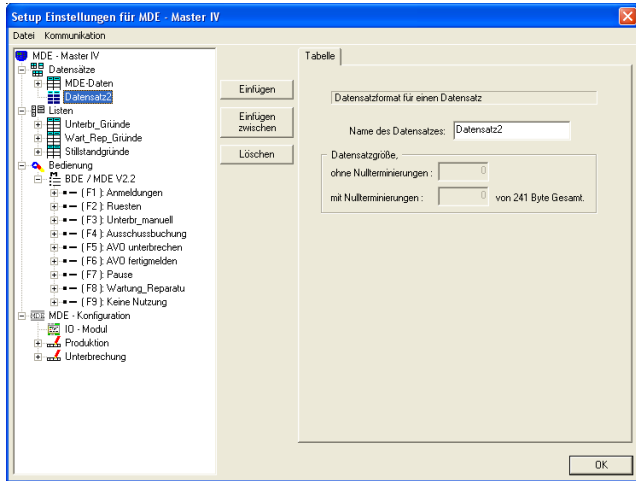



Figure 113: Creating a data record description

When creating new data record descriptions under the element Data records please proceed as follows. Select the element Data records in the tree structure (it is highlighted in blue then). Via the button Paste a new data record description is created; the tree structure is expanded to a new entry. If several data records exist you can set the position of the new data record via the button Paste between.



Note: All entries are applied automatically and do not need to be saved explicitly. Via the button OK you leave the edit dialogue and return to the setup dialogue.

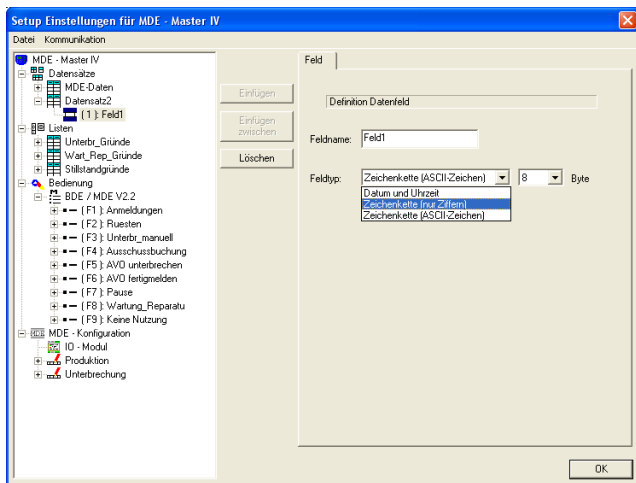


Figure 114: Creating data fields

For each data record appropriate data fields can be created and the field characteristics can be defined. This procedure is the same as when creating new data records.

The data type Date_Time is defined with a fixed length. When using strings you have to give an indication of length additionally.

5.2.5 Creating list descriptions

Lists provide a defined data base. You can compare them with the combo-box of a PC application.

!

Caution:
When creating list descriptions please note the following restrictions:

- At most 25 data fields are admissible per each list description.
- Numeric character fields and ASCII-fields with a firmware release smaller than 04.01.03 are limited to 20 characters, the following firmware versions can save up to 40 characters in the fields.
- The total length of a data record is limited to 242 byte.
- At most 20 list descriptions can be created.

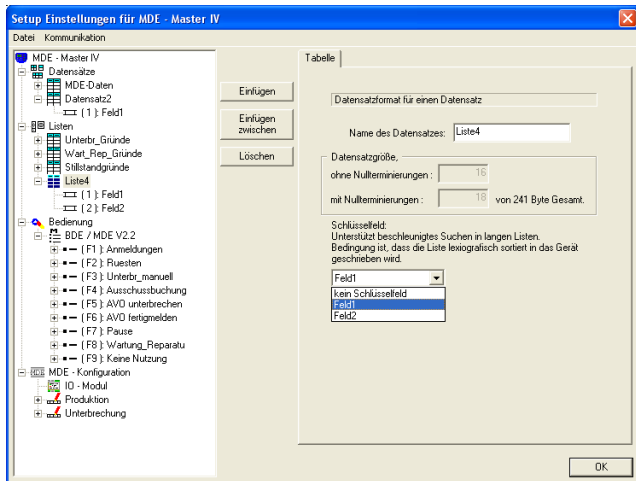


Figure 115: Listenbeschreibung erstellen

Creating and defining list descriptions with data fields is carried out analogously to the creating of data record descriptions, under the element Lists in the tree structure (see also chapter 5.2.4).

In addition you can set a list field as key field. That way searching in long lists is expedited.

The fields under the item Data size, which cannot be edited, indicate the size of a list entry, with and without end identifier (zero-termination) per each field.

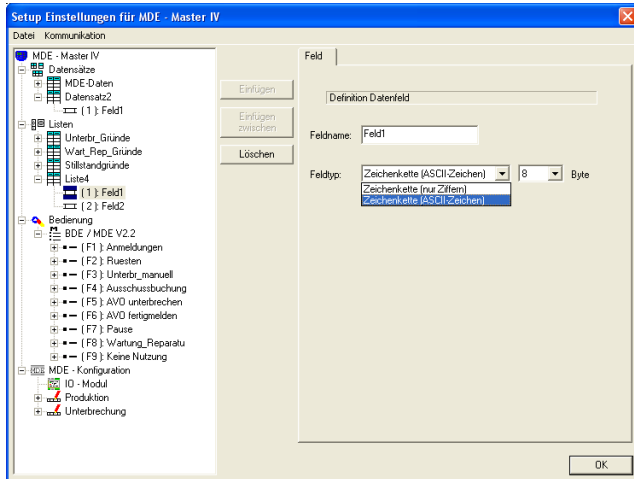


Figure 116: Creating list fields


Only the options string with numeric characters or rather string with ASCII-characters are available for a list field.

Here you also have to set the maximum length of the string.

5.2.5.1 Creating and importing lists

1.) Creating lists

If you want to work with logged lists, the user has the possibility to select particular data of a list and to transmit values to input chains. In that case the lists have to be defined in the setup and to be available as ASCII file or as text file.




Note:
If you want to import a list as *.txt file, the beginning of the file has to correspond to the name of the list description in the setup. If they do not correspond, the *.txt. file is not identified as list. In order to differentiate several lists you can expand the file name, e.g. list description in the setup is Gehtrund and the name of the list file is Gehtrund-PZE-MIV-02.txt.

According to the list definition in the setup, the list fields are separated from each other via the tabulator. In order to create lists you can use the characters A-Z, a-z and 0-9. Other characters are inadmissible. The maximum length of each field depends on the field length defined in the setup.

2.) Importing lists

Via the menu item < Setup => Listen importieren > all necessary lists are imported to the setup program. The imported lists are displayed in the main window of the setup under the point *Importierte Listen : (n von m)*. The link to the memory location of the lists, path and file name are saved with the setup. Please note, that only those lists can be imported, that are compatible with the list definitions of the setup. Otherwise the links are deleted and new compatible lists have to be imported. For this reason an edited list should be imported again to make sure, that it is compatible with the list definition.



Note:
When transmitting a setup, the lists are formatted on the device (according to the new setup). For this reason you have to import and to transmit the lists again to the device together with the setup after editing a setup.

5.2.6 Creating a user guidance

The creating and editing of the user guidance (operation) of the BDE-MasterIV is carried out analogously to the creating and editing of data records and lists. At first you create the elements via Paste or rather Paste between. Then you edit the details of the elements selected in the tree structure.

5.2.6.1 Menu and menu items

The operation of the BDE-MasterIV can be created individually, depending on the application. Initial point of the whole operation is the main menu (1) as highest level (Root) (depending on the BDE-MasterIV type).

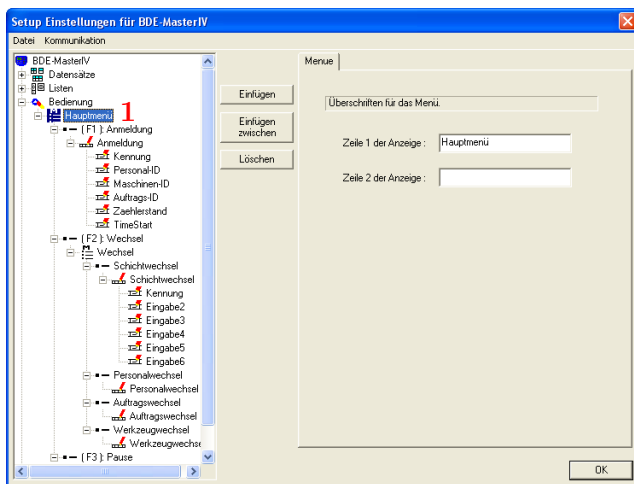


Figure 117: Creating a user guidance

At most 12 menu items can be created within the main menu. Each of it represents a function key F1...F12. You can use the first level of the operation to collect tasks or processes according to topics. So you can collect all staff- and order registrations under F1. Via the selections on the following operation menu the staff member can set, which registrations have to be worked through. Please also read the notes about the F6-chain in chapter 3.6.5.4.

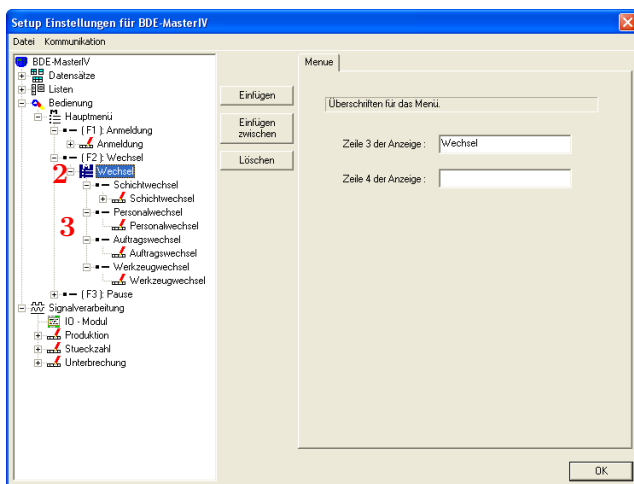


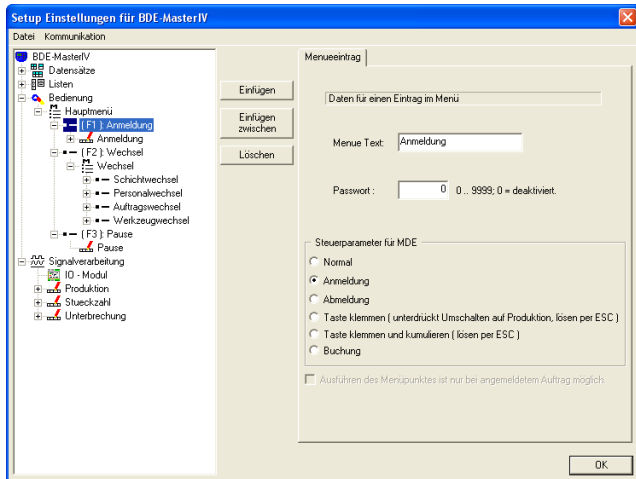
Figure 118: Creating a menu structure with submenus

Now the submenu for the actual operations (in our example Change) can be defined within the menu item of the main menu. This submenu (2) is named according to the topic (in our example Change). The 4 menu items (3) (change of shifts, crew change, order change and die change) are only the initial points for the actual processes. They are defined as input chains and can create a data record as result.



Note:

Under a menu only menu items can be created. Under menu items also menus or input chains can be created optionally. In the structure depth at most two submenus can be created, i.e. main menu - menu item - submenu 1 - submenu item 1 - submenu 2 - submenu item 2 - input chain 1 (with fields) - input chain 2 ...



As explained above, a menu item represents a booking record. For this reason it is possible to create a password for each menu item (in addition to its displayed text). This password protects against unauthorized use of the whole device or single booking processes.

Figure 119: Menu item

5.2.6.2 Defining input chains

An input chain defines a series of data fields that are entered on the device or filled automatically via collection- or control routines. Via this input chains the data records are filled by the device (see chapter 5.2.4. If several input chains are created under one menu item, they are worked through one after another.

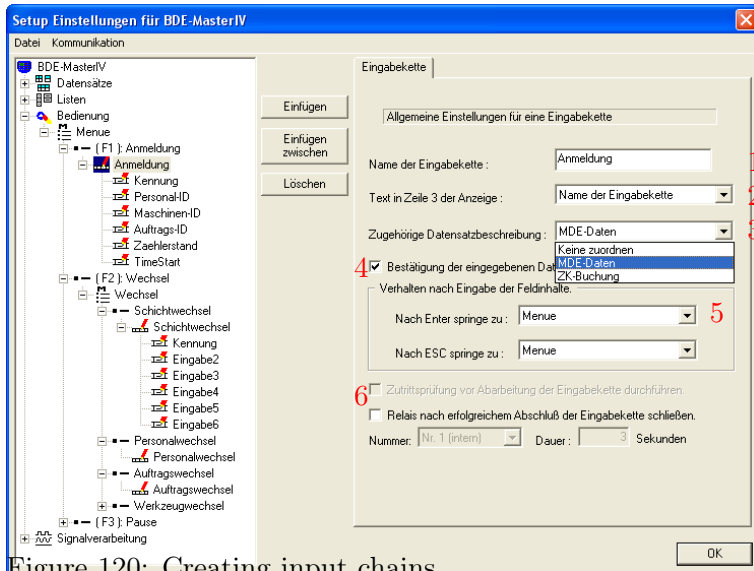


Figure 120: Creating input chains

After creating an input chain and setting a designator(1), it has to be assigned to a data record. This is done via the field with the appropriate data record description (3).

If no assignment is defined at this point, no data record is created. It is reasonable, if the input chain is only used for defining a GV (as explained in chapter 5.2.2.

Via the top line on the display further information can be provided to the user. You have to select from the name of the input chain and all defined GVs (2) displayed with their values.

In the interests of safety you can call up, whether the data should be saved at the end of the input chain. In order to do this you have to tick off (4). If this option is activated, you can return to the beginning of the input chain by pressing the ESC (without saving the data).

The reaction (5) of the device can be set depending on the ENTER/ESC-key. You can define for each key, where the device jumps to after keypress. Possible jump targets are the menu and the data fields of the input chains. That way loops can be created, e.g. when an order is selected there. Then several bookings can be carried out under one personnel number and no groups or persons need to be selected again. This is also used with the labour time collection 1 and 2.

In order to activate the access control before working through the input chain (6), you have to select access control 2 (in the basic settings of the device under operating mode).

! **Caution:** If all fields of the input chain are filled automatically (e.g. via constants or global variables), the system runs through a loop automatically: At the end of the input chain it returns to the query in the beginning. This loop cannot be left via the ESC key. It is only possible to save the input via ENTER. In this case a separate confirmation field can be defined at the end of the input chain to finish the input chain.

5.2.6.3 Defining input fields

Note: All inputs always apply to the input field selected in the tree structure.

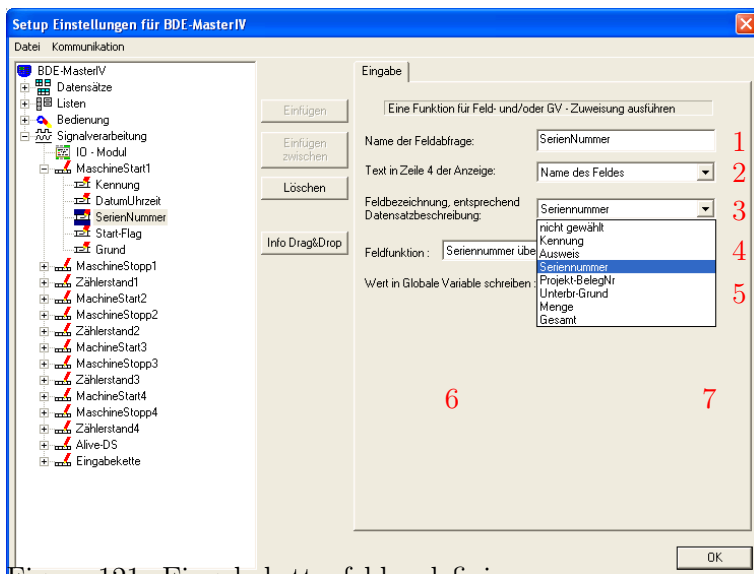


Figure 121: Eingabekettenfelder definieren

The input chain, which the input field (1) was created in, is assigned to a data record description. The same is done with the input field: It is assigned to a data field (3) of the same data record description (field description according to the data record description).

Via the top line on the display further information can be provided to the user (see also chapter 5.2.6.2)). You have to select from the name of the input field and all defined GVs (2) displayed with their values.

The value written on this field while entering can be copied to a GV. In order to do this you have to set the global variables here. (5).

The following input functions (4) are available:

5.2.6.3.1 Field functions in general

- ▶ Normal = Input via keyboard, bar code, transponder or smart card.
- ▶ Current date_time
- ▶ Select from list = In order to do this an assignment to a defined list has to occur. You may find a detailed description in chapter 5.2.5.
- ▶ Write list field = The value of a GV can be written on a selected list field via this function.
- ▶ Constant = The field is filled with a constant value.
- ▶ Confirmation = No data field is created but a stand-by position, e.g. to collect beginning and end of an occupation with two date_time fields. In front of the next field a stand-by position in form of a confirmation is pasted (see also the notes in the caution-box in chapter 5.2.6.2).
- ▶ Copy global variable to field = The value of the current global variable is copied into this field.
- ▶ Copy field into global variable
- ▶ Apply serial number (10-digit number)
- ▶ Apply analogous measurement
- ▶ Apply digital measurement (16-digit number)
- ▶ Apply counter reading
- ▶ Apply function value
- ▶ Apply threshold status
- ▶ Apply GPRS Alive counter
- ▶ Apply firmware version (xx.xx.xx.xx)
- ▶ Apply status of summer-/wintertime (S/W)
- ▶ Apply GPS data (27-digit RMC)
- ▶ Apply GPS data (variable selection)
- ▶ Copy Timeboy variable to field
- ▶ Start/Stop Timer
- ▶ Carry out access control with GV = You can carry out an access control within an input chain.
- ▶ Switch relay
- ▶ Apply debug value
- ▶ Write transponder value

5.2.6.3.2 Field functions of the access control

- ▶ Access: apply ZM (AccessMaster) = The value of the ZM is applied from the reader list.
- ▶ Access: apply TM (DoorrModule) = The value of the TM is applied from the reader list.
- ▶ Access: Apply card number = The read card number is applied.
- ▶ Access: Apply status = The basic status of the initialized ZK-bus and of an action carried out is applied

5.2.6.3.3 Field functions fingerprint (BioKey)

- ▶ Fingerprint: scan = The finger of the person is scanned by the BIO-key module.
- ▶ Fingerprint: teach-in fingers = PID and finger templates are connected and logged as key values in the BIO-key module.
- ▶ Fingerprint: delete finger templates
- ▶ Fingerprint: read finger templates from card
- ▶ Fingerprint: carry out verification
- ▶ Fingerprint: carry out identification

If Date_Time is set as field assignment, this field is deactivated. It is done, because the option Current date_time is applied automatically and the format is identified automatically via the data record description.

Via the register card Jumps jump objects can be defined (for terminating the input via ESC). Possible jump objects are the menu itself or any point of the input chain.

Jump labels can also be defined for normal processes; e.g. an input value can be compared with a format string. The format string can be set here or the value of a GV can be used. Only if both values (input value and format string) are concurrent or are not (negative comparison), it can be jumped into the set field of the input chain.




Note:

When a bar code is scanned, the settings under Additional functions for bar code are worked through in the device and then a format check is carried out.

5.2.6.4 List selection

The function Select from list allows the selection of values from a list or to use list values for check an input; e.g. accounts, occupation lists, cost centres etc. Before you can select from lists you have to define

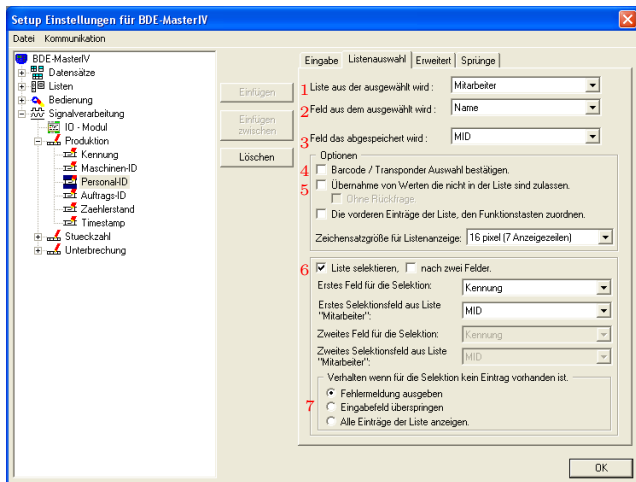
some lists (see chapter 5.2.5) and to import them (including data)(see chapter 5.2.5.1).



Note:

There are three methods available for list selection. You can use them separate or in combination. A list selection via direct input is impossible because the BDE-MasterIV has not got a keypad.

For all the methods you have to set as follows:



The function Select from list was set for one input field.

Via the register card List selection a list definition with the item List to be selected from (1) has to be assigned. Via the item Field to be selected from (2) the display is set.

You set which data are saved via the item Field to be saved or rather Field to be compared with bar code (3).

Figure 122: List selection

Depending on the chosen method further settings might be necessary

- 1.) Simple list selection by scrolling (arrow keys ▲ ▼) and selection via ENTER

This method is suited to the manual selection of failure reasons etc. excellently. No further settings are necessary.

- 2.) List selection via bar code; input check on the basis of the logged list

At first you have to activate the option (4) Confirm bar code/transponder selection. An appropriate note is displayed. You have to confirm the booking record via ENTER.

The input is checked automatically. Therefore the further process has to be defined as Value read via bar code/transponder was not found, if a bug occurs. Nevertheless the value that was not found can be applied (with or without query)(5).

- 3.) List selection via selection

At first you have to activate the option (6) Select list. That way it is possible to compare an entered/read-in value with a value in the assigned list. If the comparison is positive, the value is saved on the assigned data record field via the option Field that is saved or rather compared with bar

code. If the comparison is negative, 3 options are available. A message is displayed: The searched value was not found in the list. The device returns to the defined position (if the PZE-mode 2 is activated via the time zones).

If the comparison is negative, these 3 options (7) are available.

- a.) First option: An error message is displayed (The searched value was not found in the list). The device returns to the defined position (if the PZE-mode 2 is activated via the time zones).
- b.) Via the option Skip input field the input field is skipped and no data record field is filled. The input chain is not interrupted here.
- c.) Via the option Display all inputs the user gets the possibility to select an input from the list manually by scrolling (arrow keys)(▲▼).

5.2.6.5 Expanded

Often several information are logged in a bar code or transponder to reduce the input expense. The BDE-MasterIV offers the possibility to depacketize this combi-bar codes/ -transponders and to distribute them to various fields.

At first an input field is created to save the read value on a GV (see chapter 5.2.2. Then the input fields (each accommodates a part value) are defined in the input chain. For each of this fields the function Copy global variable is selected on the register card Input. Under Write global variable on field the GV, that should be depacketized, is selected.

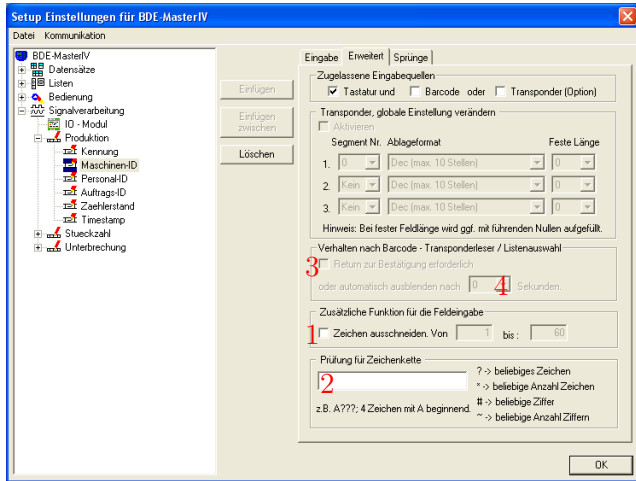


Figure 123: Expanded

On the register card Expanded the option Cut out character of (1) is activated and the field part is set by setting start and end position of the fields to be read. Additionally a format check for string (2) (with a set format) can be carried out here.

5.2.6.6 Reaction on list selection

- ▶ If you tick off Return necessary for confirmation (...), the list is displayed until a selection is made (in case of a list selection).
- ▶ (no tick) Timeout 0 (...). The first found list input is applied without being displayed. Please be careful in this case!
- ▶ (no tick) Timeout >0. The list is displayed. You can select a list input by scrolling and apply it via ENTER. If no acceptance occurs via ENTER, the selected list input is applied automatically after the set time.

5.2.6.7 Jumps

This field is available, if one of the following input functions is selected: Normal, Select from list, Write list field, Confirmation, Copy GV/Timeboy variable to field, Copy field to GV/Timeboy variable, Fingerprint: scan/ teach-in fingers/ delete finger templates/ carry out identification/ carry out verification or apply debug value.

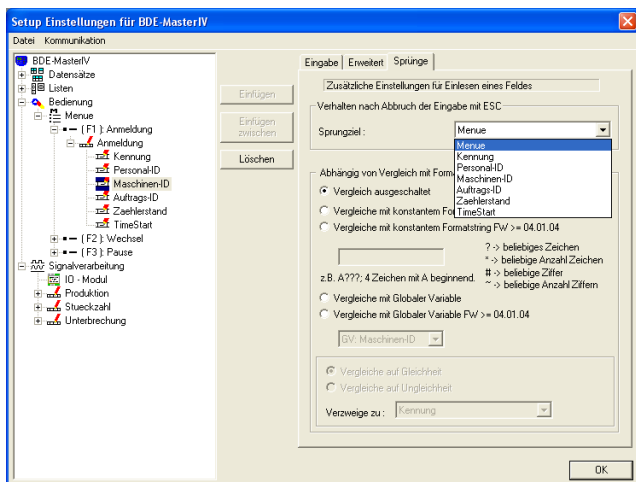


Figure 124: Defining jumps

Via jumps you can leave input chains early. You can configure input chains so that you can jump back field by field via ESC. A jump target is also precondition to terminate a loop.

That way it is possible to define also complicated processes.

Various loops can be created in form of different input chains. The PZE-mode also corresponds to a loop, which is always run through from the beginning.

By comparing the input with a given string or with the content of a global variables, you can carry out further intersections (depending on the comparison).

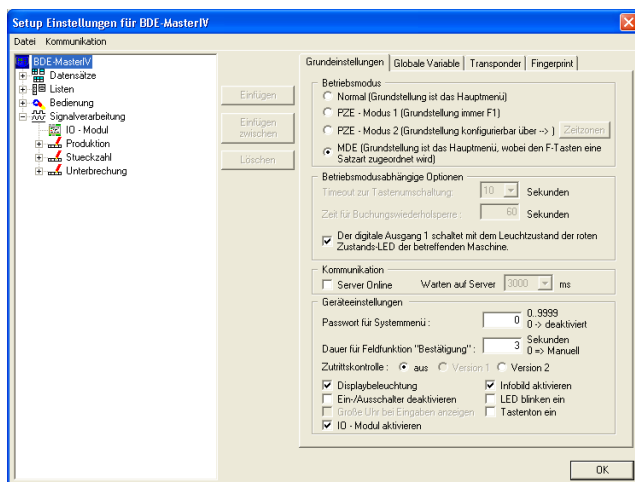
5.2.7 MDC configuration

Via the MDC the dependencies between booking processes are defined. They are compulsory for a process-spanning data collection. That way e.g. an order de-registration cannot be booked before an order registration. These settings are assigned to a menu item. They are valid for all input chains of this menu item.

5.2.8 Signal processing

Via the signal processing the digital and the analogous inputs are supervised and the digital outputs controlled.


There are four digital inputs (1 kHz) and four digital inputs (10 Hz) available in the basic equipment of the BDE-MasterIV.



If further digital and analogous inputs are necessary, an Datafox IO-Modul can be connected to the BDE-MasterIV. Then you have to activate the Datafox IO-Modul in the basic settings of the BDE-MasterIV.

Figure 125: Activating the Datafox IO-Modul in the basic settings

5.2.8.1 Use as Start/Stop



Note:
 In principle it is valid:
 The (odd) digital inputs 1, 3, 5 and 7 can be used with at most 1 kHz; the (even) inputs 2, 4, 6 and 8 with at most 10 Hz.

When using as Start/ Stop a single digital input is allocated. It is appropriate to use the slower 10 Hz input for this.

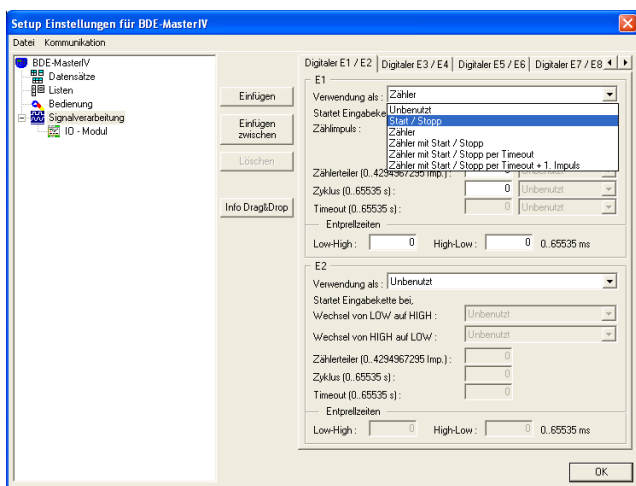


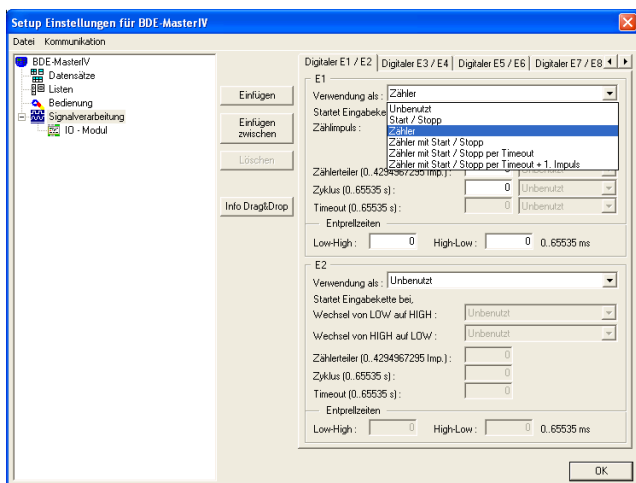
Figure 126: Use as Start/Stop

When using as Start/ Stop an edge change (High to Low or Low to High) is interpreted as a valid signal, only if the signal level is over the period of time set as debounce time. Then the assigned input chain is started once only. This function you can use e.g. to supervise a machine. E.g. edge change from Low to High: The input chain Production could be called up once only. Edge change from High to Low: The input chain Interruption would be started.

The cycle indicates the interval, in which a data record is created (irrespective of an impulse). The input chain, selected in the started/stopped machine is carried out cyclically.

5.2.8.2 Use as counter

When using as counter a single digital input is allocated. It is reasonable to use the faster 1 kHz input for this. For this please note the following:

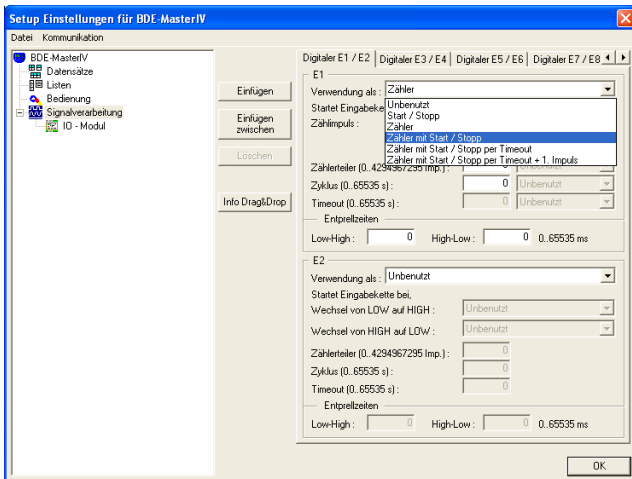


A valid counting impulse starts the assigned input chain. The counter splitter indicates, how many single impulses can be combined into one counting impulse. This value can be between 0 and 4.294.967.295. The cycle indicates the interval, in which a data record is created (irrespective of an impulse).

Figure 127: Use as counter

5.2.8.3 Use as counter with Start/Stop

When using as counter with Start/Stop two digital inputs are allocated. The faster 1 kHz input is used as counter and the slower 10 Hz input as Start/Stop.

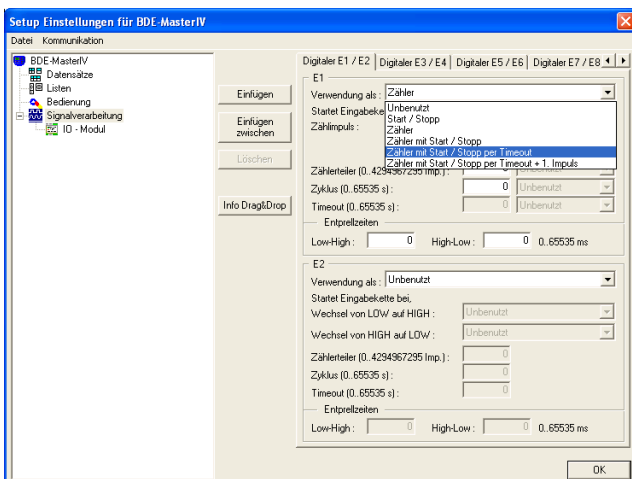


Both inputs are configured according to their use (see figure 127 and 126. Here you also have to pay attention to the debounce time for a defined signal level.

Figure 128: Use as counter with Start/Stop

5.2.8.4 Use as counter with Start/Stop via timeout

When using as counter with Start/Stop via timeout a single digital input is allocated. It is reasonable to use the faster 1 kHz input for this, because it also functions as counter.



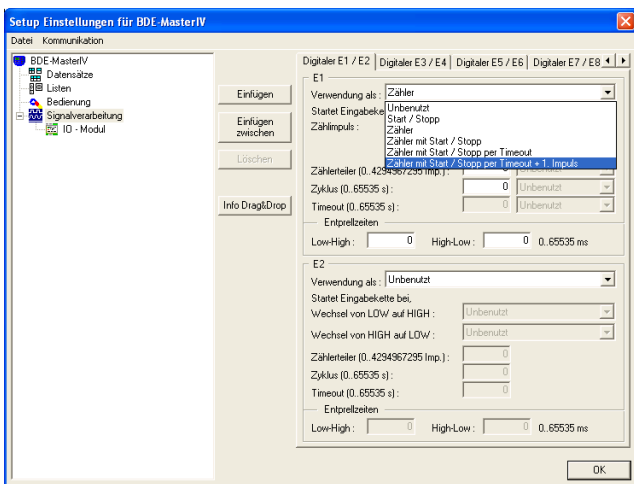
The counter for produced pieces is the signal for a running machine concurrently. In order to notice interruption or switching-off of the machine the timeout is supervised. When the timeout has run out without registering a counting impulse, an interruption data record is created. The timeout is put back after each impulse (change from Low to High), that fulfils the conditions of the debounce time.

Figure 129: Use as counter with Start/Stop via timeout

The cycle indicates the interval, in which a data record is created (irrespective of an impulse). It is activated after the first impulse and deactivated after reached timeout. The cycle carries out the input chain for Start and counting impulse.

5.2.8.5 Use as counter with Start/Stop via timeout and 1st counting impulse

When using as counter with Start/Stop via timeout and 1st counting impulse a single digital input is allocated. It is reasonable to use the faster 1 kHz input for this, because it also functions as counter. Furthermore it is possible to create a data record with the first counting impulse.



The input chain, assigned to first impulse and counting impulse, is started with the first impulse (change from Low to High) and then according to the counter splitter. The counter splitter indicates, how many impulses are necessary to activate the assigned input chain. The input chain is not carried out, if 0 is indicated.

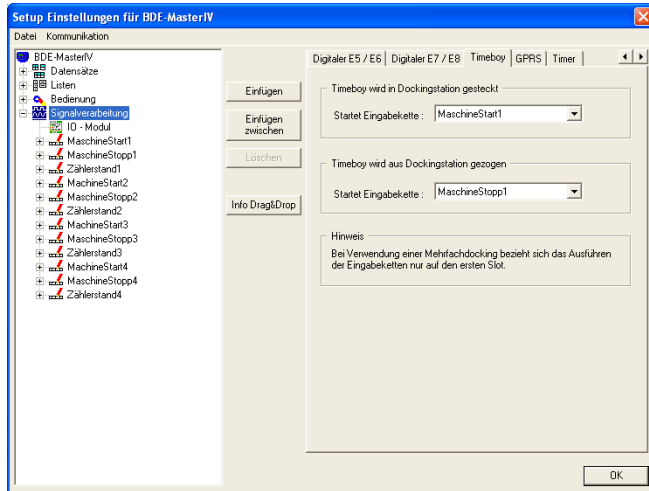
If no further impulse is detected within the time of the timeout, the input chain for the timeout is started. A further impulse restarts the input chain of the 1st impulse.

Figure 130: Use as counter with Start/Stop via timeout and 1st counting impulse

The debounce time indicates, how long the signal level has to remain unchanged to be detected as impulse. This is valid for both the change of level from Low to High (starting a device) and the change of level from High to Low (stopping a device).

The cycle indicates the interval, in which a data record is created (irrespective of an impulse). When stopping the machine the cycle is deactivated (as far as the machine status is Start).

5.2.8.6 Connection Timeboy



Via the register card Timeboy input chains can be assigned to the actions Plug-in Timeboy and Pull-out Timeboy. They are activated, when the action occurs.

Figure 131: Assignment of input chains to plugging-in- and pulling-out-events

5.2.8.7 Alive data record

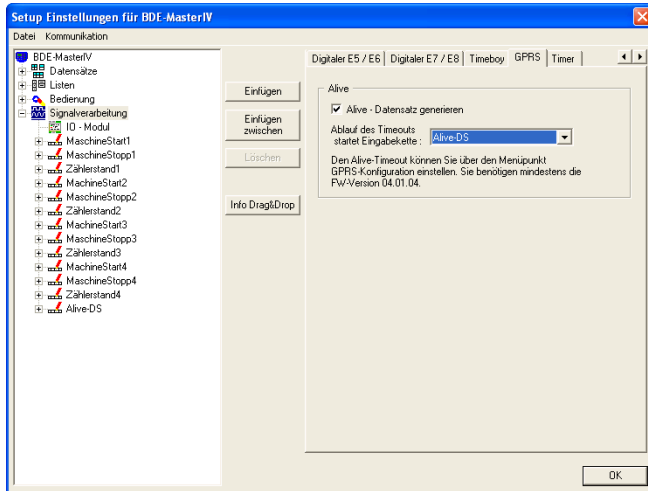


Figure 132: Setting the alive data record

With elder firmware versions the alive data record was created via the F6 input chain.

Now it is possible to create an input chain for the creation of alive data records via signal processing. In both variants the alive parameter in the GPRS.ini has to have a value larger than 60.

The BDE-MasterIV checks Alive via F6 chain and then Alive via signal processing.

5.2.8.8 Setting of timers

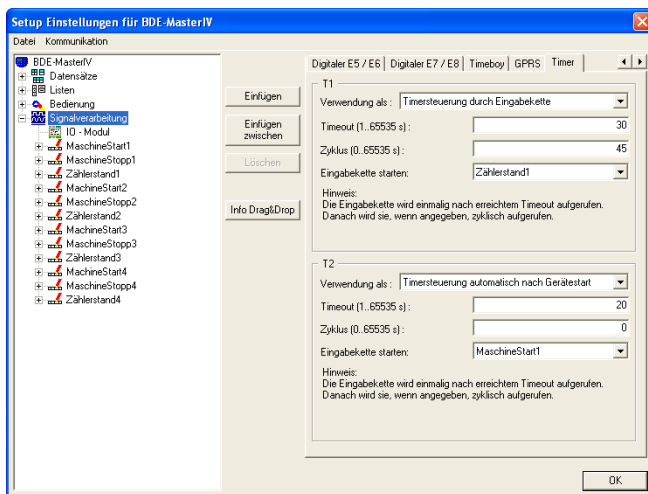


Figure 133: Setting of timers

Two types of timers are available. They are started either via an input chain (call up the function Start/stop timer) or automatically after starting the BDE-MasterIV. An input chain can be assigned to each timer. It is called up after the timeout was reached and then, if set, cyclicly.

5.2.8.9 Setting of timers

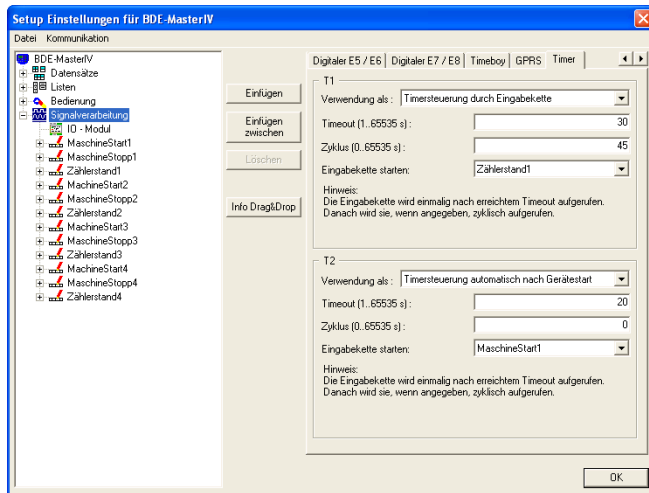


Figure 134: Setting of timers

Two types of timers are available. They are started either via an input chain (call up the function Start/stop timer) or automatically after starting the BDE-MasterIV. An input chain can be assigned to each timer. It is called up after the timeout was reached and then, if set, cyclically.

5.2.9 Mathematical operations

The mathematical operator can carry out addition, subtraction, comparison (equal, not equal, greater/less than) and negation (No). The operand (the information) has to be available as string in decimal form [0..9]. The operands can be provided as constants, global variables or fields with the format (only numeric characters).

The operations addition and subtraction do not have to be explained further.

The following is valid for the negation (No): Each value of the operand > 0 has the result = 0; each value of the operand = 0 has the result = 1.

The following is valid for the comparison operations: A positive comparison (Yes) has the result = 1; a negative comparison (No) has the result = 0.

The result is stored in a global variable. The value this GV can be used for the decision for jump target.

formatting operations

Record fields and GV (global variables) can be convert between hexadecimal strings and dezimal strings or between dezimal strings and hexadecimal strings. You can set a mask of zero sign to get a constant length of string. The maximum mask length is 16 characters. The max. resolution of operands is 8 Byte (64bit).

Example

Value in GV 0000290A should be convert to a dezimal value 9994 with a mask of 00000000. The result is 00009994.

5.3 Creating setups

5.3.1 Setup for order time collection

In this chapter there is explained, how you can create a setup for order time or machine data collection and how to create orders (to send them to the device). Please plan 3 up to 4 hours for working through this chapter. Take the time so that you can comprehend each step in a test environment.

5.3.1.1 General

In our test environment you want to use the following booking records:

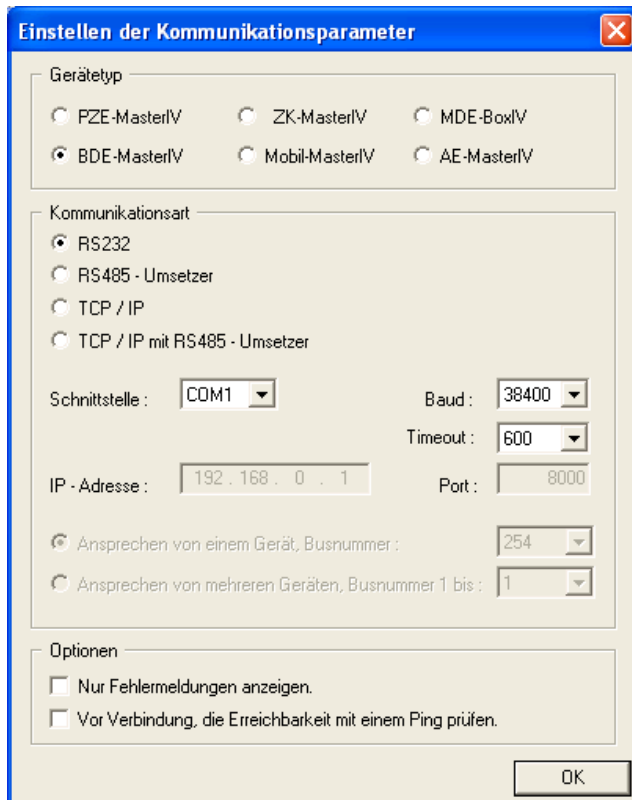
- ▶ **Kommen** (indicates, when a staff member arrives)
- ▶ **Gehen** (indicates, when a staff member leaves)
- ▶ **Gehen mit Grund** (indicates, when a staff member leaves preterm)
- ▶ **Salden Info** (indicates the accounts of the staff member)
- ▶ **Zähler reset** (resets the counter to 0, e.g. waste produced)
- ▶ **Maschine Start** (indicates, when the machine is started)
- ▶ **Maschine Stop** (indicates, when the machine is stopped)
- ▶ **Zählerstand** (counts the produced workpieces)

The digital inputs 1 and 2 of the BDE-MasterIV are used for machine data collection. The digital input 1 is used as counter of the produced workpieces, the digital input 2 controls the switching-on and -off of

the machine. The project selection is realized via the bar code lists (available on the workplace). The appropriate code with a bar code reader (connected to COM 2, plug 5 in figure 7) is read for selection.

5.3.1.2 Basic settings of the setup

At first you have to start the DatafoxStudioIV. Open the dialogue for creating the communication parameters via *< Kommunikation => Einstellungen >*.



Set the device type BDE-MasterIV.

In this example you select the communication type RS232. Select the interface, as it is allocated on your server (standard COM1). Baud rate and timeout value can remain on the standard values in this case. But you should control the concurrence of the settings via the system menu-BIOS of the BDE-MasterIV under communication. If they are not concurrent, you have to adapt the parameters via terminal or DatafoxStudioIV. Confirm all changes via OK.

Figure 135: Setting of device type and communication parameters

Via *< Datei => Speichern unter >* you can save this setup (standard AESetup1) with an own name. In the following example you use the name BDE-MasterIV-Testsetup.aes.

You can also create a new setup file via *< Datei- > Neu >* and save it with an own name. The setting of device type and communication parameters is important.

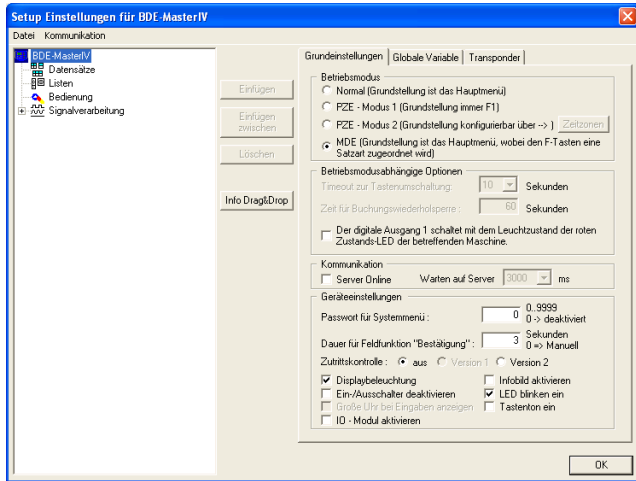


Figure 136: BDE-Master basic settings

After saving the setup with an own name, the basic settings can be set. You may find a detailed description for this in chapter 5.2.1. Select the operating mode MDE (to create dependencies between the function keys). In the following example no access control is used, therefore this option is deactivated. Tick off Display lighting and LED flashing.

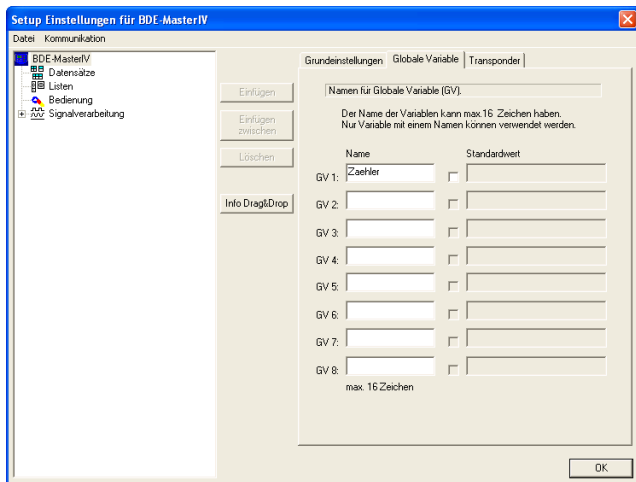


Figure 137: BDE-Master global variables

In order to demonstrate the use of global variables you define one with the name Counter, which shall be used to buffer the counter reading.

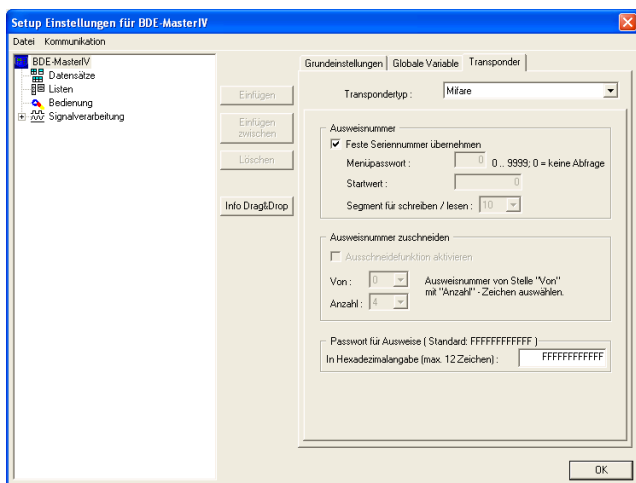
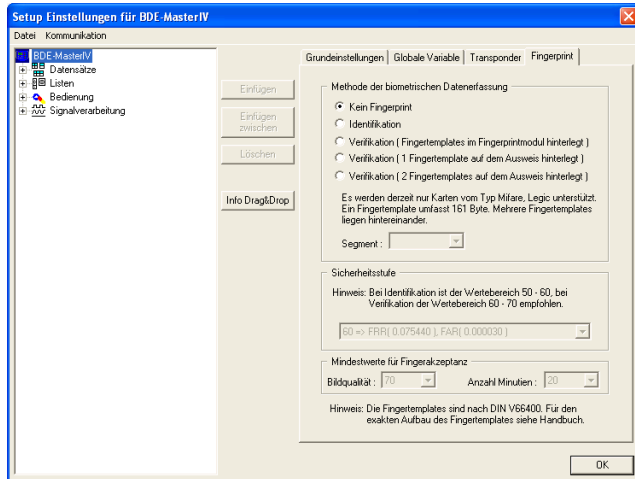


Figure 138: Transponder settings

In this example you use a transponder of the type Mifare. You also activate the option Apply fixed serial-no. to read out the card number.



In the following example no biometric data collection is used.

Figure 139: Settings of the fingerprint

5.3.1.3 Creating a data record description

In order to create a data record description you should exactly know, which data have to be created.

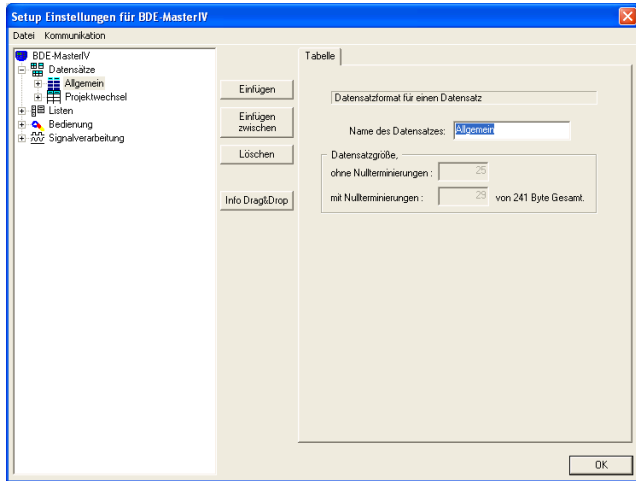
Example: While a booking record data records shall be created, containing the following information:

General

- 1.) **Kennung** (indicates, which booking record is carried out)
- 2.) **Ausweis** (card number logged on the transponder)
- 3.) **DatumUhrzeit** (used as time stamp)
- 4.) **Seriennummer** (serial number of terminal to differentiate the data records)
- 5.) **Gehtgrund** (indicates the reason of a staff member leaving preterm)

Project change

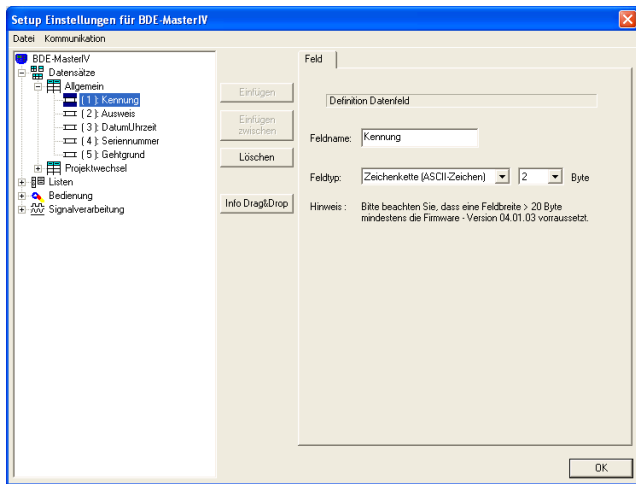
- 1.) **Kennung** (indicates, which booking record is carried out)
- 2.) **Ausweis** (card number logged on the transponder)
- 3.) **DatumUhrzeit** (used as time stamp)
- 4.) **Seriennummer** (serial number of terminal to differentiate the data records)
- 5.) **Projekt-BelegNr** (indicates the project that is worked on)
- 6.) **Unterbr-Grund** (indicates the reasons for stopping a machine)
- 7.) **Menge** (counts the number of produced workpieces of each machine)



The dialogue for editing the setup is opened via a double click on the client range of the DatafoxStudioIV or via `< Setup => Editieren >`. Mark the input Data records on the left side of the tree and click on Paste twice. Under Data records the entries Datensatz1 and Datensatz2 are created. Mark one entry and you can edit its characteristics on the right side. Please enter the names General and Project change there. Mark one entry again in the tree. Now its name is updated.

Figure 140: Creating the data records

Mark the data record General and create 5 data fields. For the data record Project change you have to create 7 data fields. The rough definition is finished. Now you have to set which data types (and their length) should be in each field. The following data types are available: string with numeric characters, string with ASCII-characters (text) and date_time.



Mark an input in the tree and set the characteristics on the right side. Identification is defined as string with ASCII-characters (length 2). Card is set as string with numeric characters (length 10). Date_Time is set as date_time. The Serial-No. is defined as string with numeric characters (length 4) and Exit reason as string with ASCII-characters (length 2).

Figure 141: Creating the data records

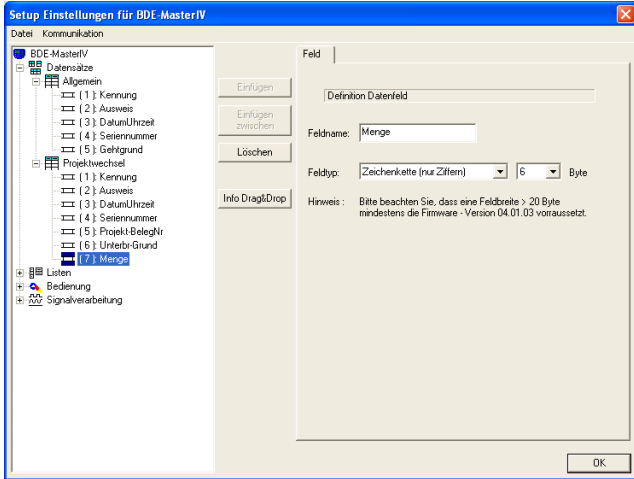


Figure 142: Creating the data records

Identification is defined as string with ASCII-characters (length 2). Card is set as string with numeric characters (length 10). Date_Time is set as date_time. The Serial-No. is defined as string with numeric characters (length 4) and Project record-no. as string with ASCII-characters (length 20). The data field Stopping reason is set as string with ASCII-characters (length 2) and Amount as string with numeric characters (length 6).

5.3.1.4 Creating the lists

After setting, which data should be created, you have to consider, which information are necessary for this.

The following information are provided in three lists: Account information, Reasons for preterm leaving of workplace and Machine stoppings.

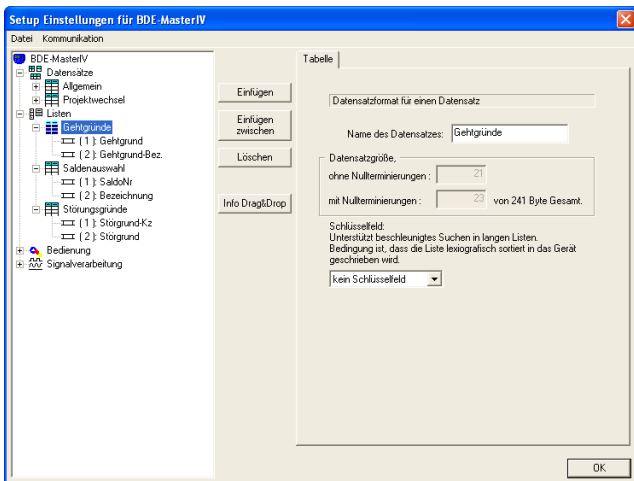


Figure 143: Creating the lists

These three lists are defined in the DatafoxStudioIV appropriately. Mark the input Lists in the tree of the edit dialogue. Create a new list via Paste and name it Exit reasons. Add 2 fields. At next mark one list field to set the appropriate settings on the right side. The field Exit reason is defined as string with numeric characters (length 1) (according to the data record description) and the field Exit reason-designation is set as string with ASCII-characters (length 20).

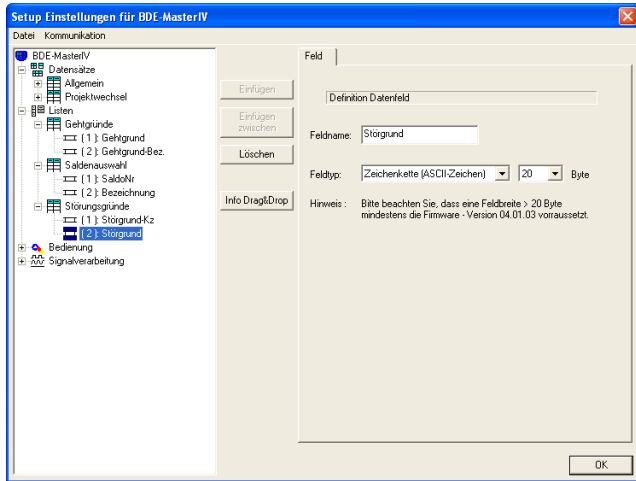


Figure 144: Defining the list fields

The lists Account selection and Reasons of disturbance are defined analogously. Account selection contains the fields Account-no. (string with numeric characters (length 10)) and Designation (string with ASCII-characters (length 20)). The list Failure reasons contains the fields Failure reasons-sign (string with ASCII-characters (length 2)) and Failure reasons (string with ASCII-characters (length 20)).

The 3 lists have to be created via an editor (e.g. Microsoft Editor) and saved with the appropriate name as a *.txt . Another possibility is the creating of lists via an own software. The fields of the lists are separated via a tabulator. Comment lines start with a semicolon.

List Exit reasons

```
;Gehtrgrund  Gehtrgrund-Bez
1  Kundenbesuch
2  Post
3  Bank
4  Werkstatt
5  Lieferfahrt
```

List Account selection

```
;SaldoNr    Bezeichnung
1234567890  Name: Arbeiter 1
1234567890  Urlaub: 8
1234567890  Überstunden: 4
1011121314  Name: Arbeiter 2
1011121314  Urlaub: 12
1011121314  Überstunden: 3
2043758694  Name: Arbeiter 3
2043758694  Urlaub: 9
2043758694  Überstunden: 14
```

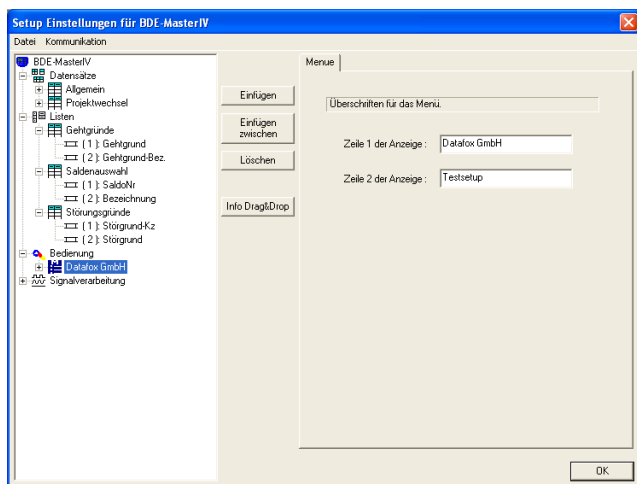
List Reasons of disturbance

;Störgrund-Kz Störgrund
 MF Material fehlt
 BS Bandstörung
 AT Antrieb ausgefallen

5.3.1.5 Definition of the device operation

After defining data records and lists you have to set, how the booking records shall proceed. In other words, you have to set how the device reacts when inputting something and what is expected from the user. In this connection pressing a key on the device or reading a transponder or bar code can be an input. The digital inputs are also used to call up input chains.

For this you have to decide at first, which booking records shall be carried out. In our example you want to collect the following information: Entry/Exit of staff, Start/Stop of machine, Projects and Number of pieces.



At first you have to create the main menu. The display text can be defined freely, e.g. you can enter your firm name. 16 characters are available for each line.

Figure 145: Creating the main menu

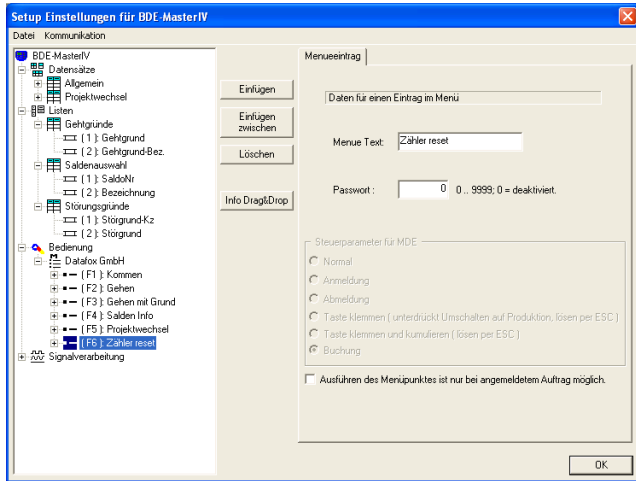


Figure 146: Creating the function keys

After the main menu the function keys (see figure 3.4.1) have to be defined. In our case you need the keys F1 to F6. On the right side you can enter the names of the F-keys.

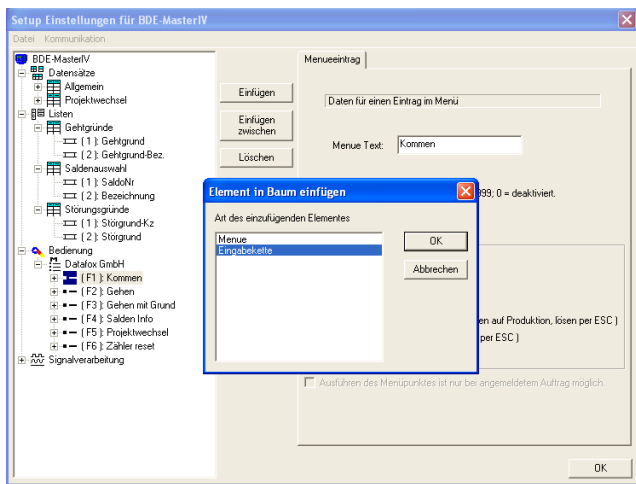


Figure 147: Creating an input chain

For the F1-key you define an input chain, which is the actual booking record, i.e. via the F1-key the booking record is initialized.

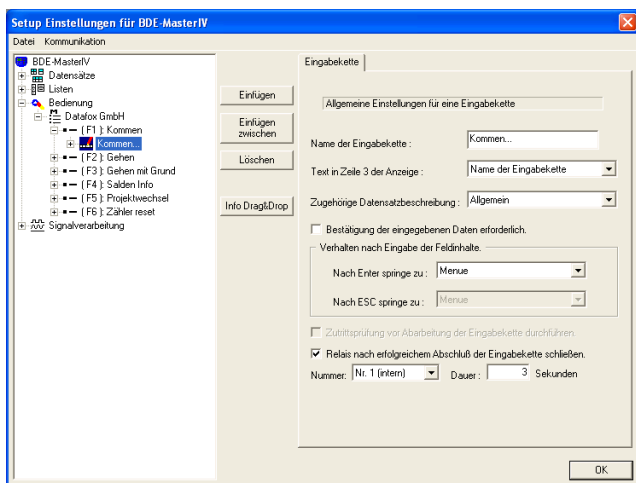


Figure 148: Settings of an input chain

The input chain can be configured on the right side: Entering a name (Entry ...) and assigning a data record description (which data record shall be created). In our example you assign General. Confirming the input is not necessary, because the booking record shall be automated. After running through this input chain, the relay no. 1 shall be closed for 3 seconds. Activate the appropriate options in order to realize this.

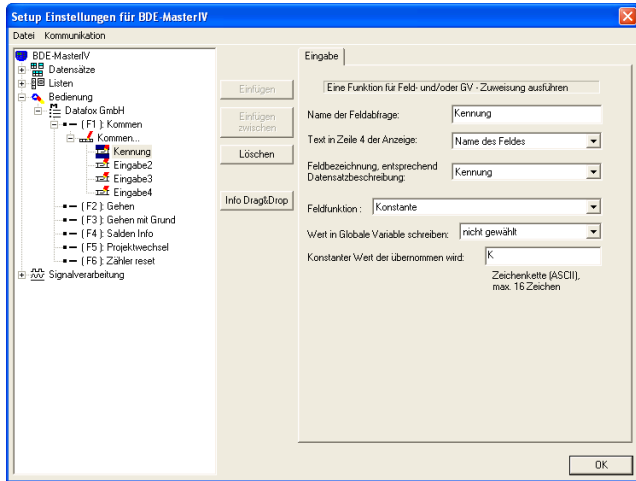


Figure 149: Configuration of the input Identification

Mark the input chain Entry... in the tree structure and add 4 input fields. Mark the first input field, name it Identification and select the appropriate data field (field description according to the data record description), that shall be filled with data. In our example select the field Identification. You use the function Constant and set En (= Entry) as constant value.

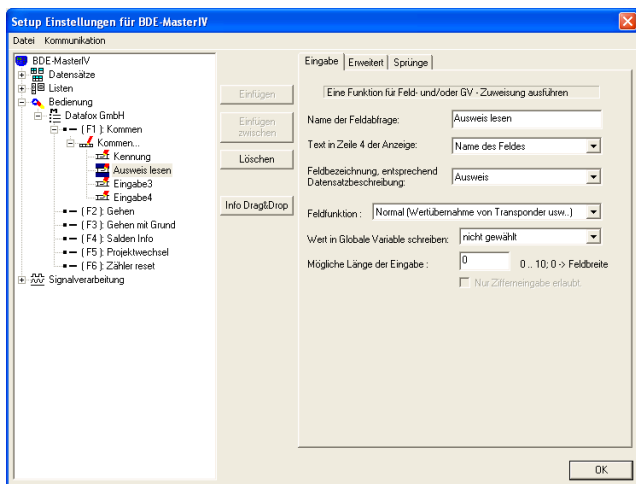


Figure 150: Configuration of the input Read card

The next field is named Read card. Select Card as field description (according to the data record description) and set the field function Normal (value transmission via transponder). The maximum field length of (0) is not changed.

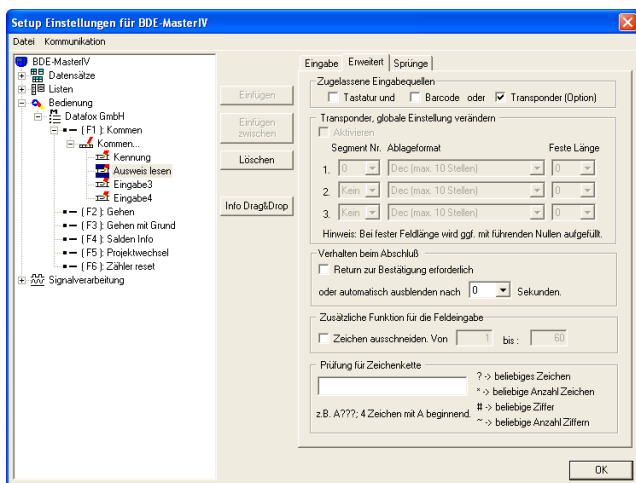


Figure 151: Expanded characteristics of Read card

On the page Expanded the transponder as permitted input source has to be activated. The option Return necessary for confirmation has to be deactivated. Set the value for fading out automatically to 0 seconds.

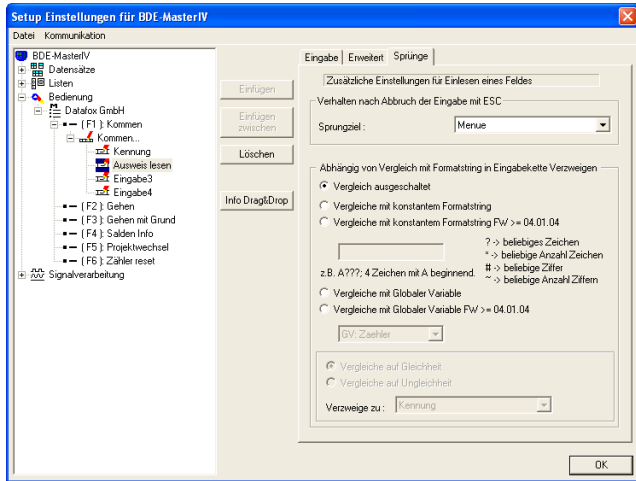


Figure 152: Jump characteristics of Read card

You only want to read out a value from a transponder to transmit it to a data field, but you do not want to carry out any checks. Therefore you can apply the default settings on the register card Jumps.

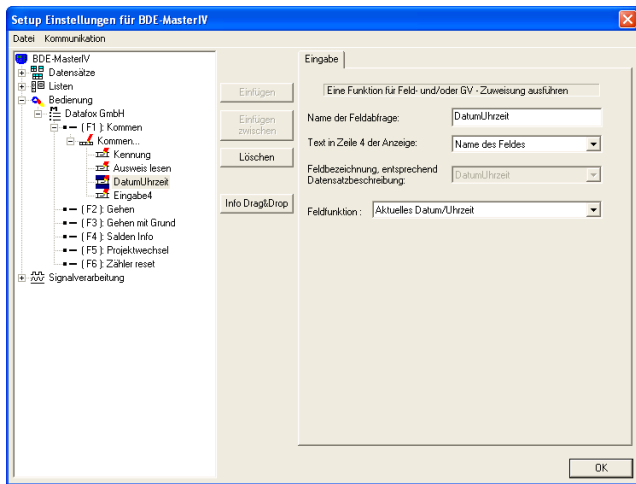


Figure 153: Configuration of the input DateTime

The next field is named Date_Time. Select the field function Current date_time. The field description switches to date_time automatically then.

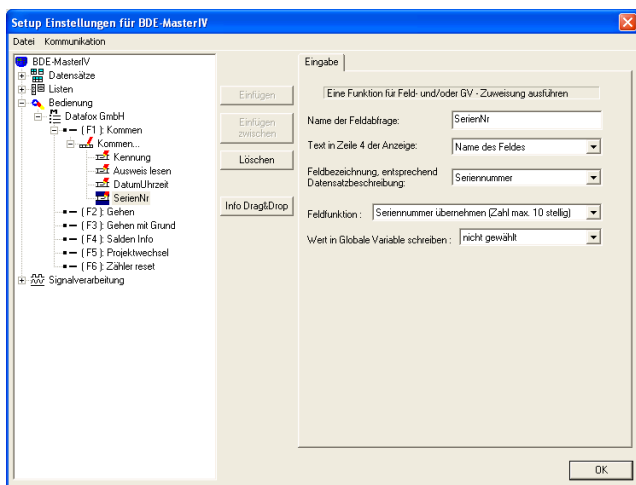
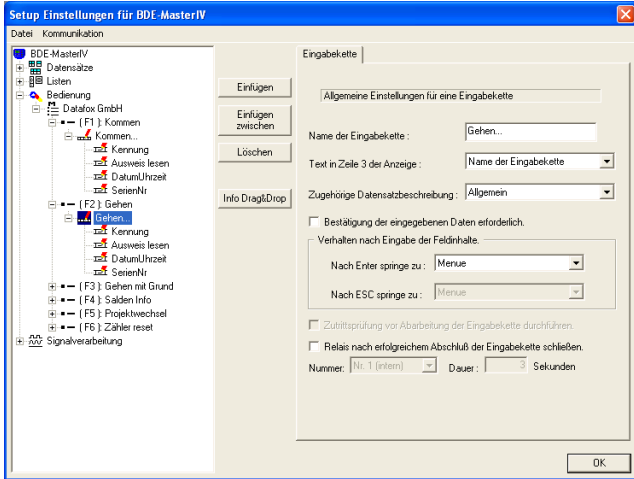


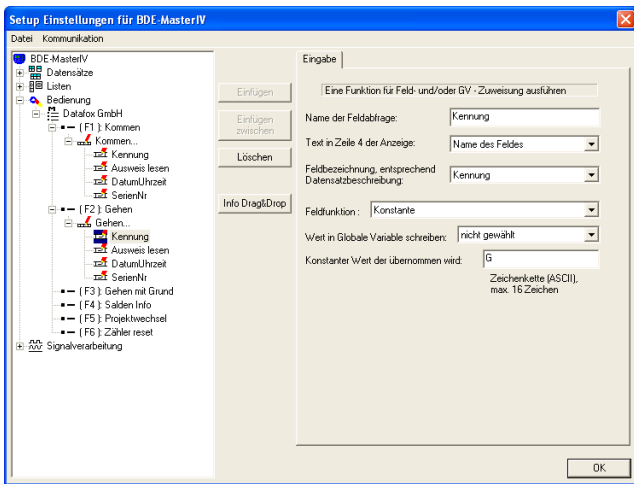
Figure 154: Configuration of the input Serial-No

The last field of the input chain Entry... is named Serial-No. Assign the data record field Serial number. The serial number of the BDE-MasterIV is written on the field Serial-No. via the field function Apply serial-no.



Mark the next input chain and name it Exit... Select the appropriate data record description General. Further settings are not necessary. Add 4 fields by clicking on Paste.

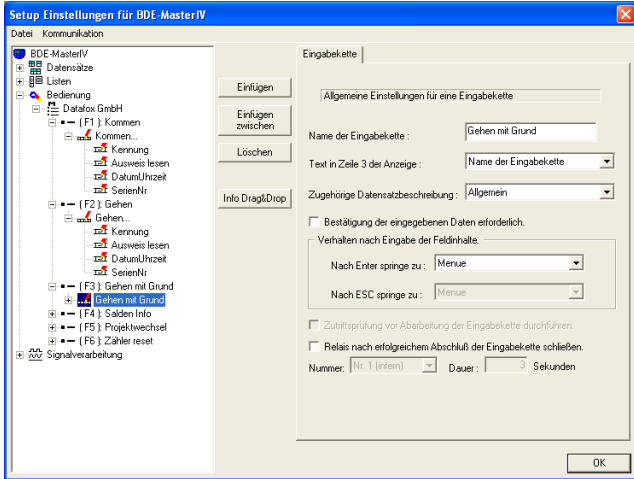
Figure 155: Settings of the input chain Exit...



The first field is named Identification (with a data record description assigned appropriately). Select the function Constant and set Ex (= Exit) as constant value, that identifies the data record.

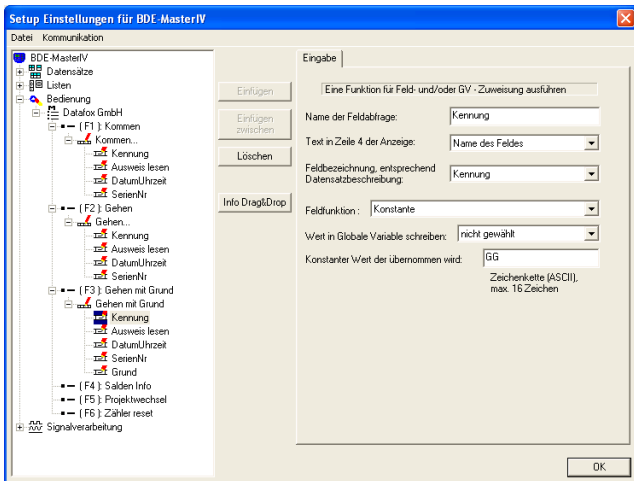
Figure 156: Configuration of the input Identification

The following three fields (Read card, Date_Time and Serial-No.) are identical to their same-named counterparts used in the input chain Entry... Please apply the settings of the figures 150 - 154.



The third input chain is named Exit with reason. Assign the data record description General. The other options remain inactive. Add 5 input chain fields.

Figure 157: Settings of the input chain Exit with reason



The first field is named Identification. Assign the same-named data record field. Select the function Constant and set ExR (= Exit with reason) as constant value, that identifies the data record.

Figure 158: Configuration of the input Identification

The following 3 fields (Read card, Date_Time and Serial-No.) are identical to their same-named counterparts used in the input chain Entry... Please apply the settings of the figures 150 - 154.

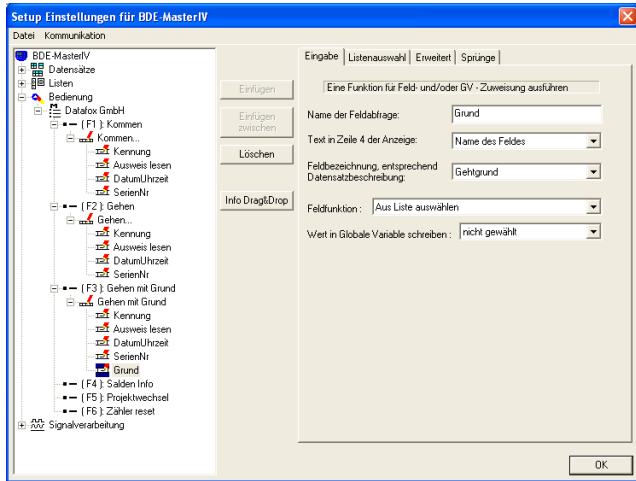


Figure 159: Configuration of the input Reason

The last field shall be used to collect the exit reason. It is named Reason and assigned to the data record field Exit reason. Select the field function Select from list.

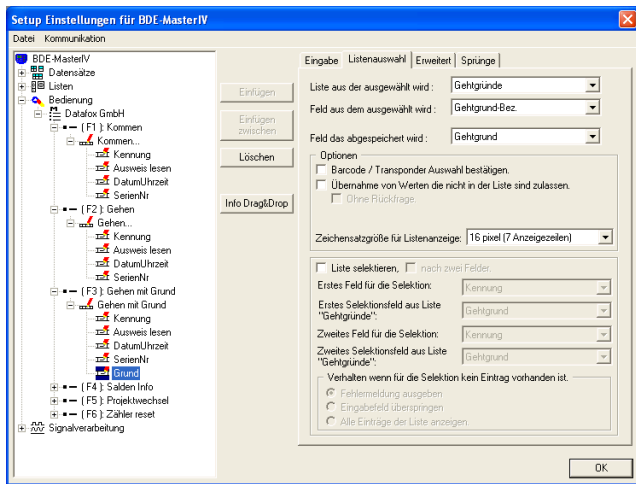


Figure 160: List selection of Reason

Open the register card List selection at next. Select the list Exit reasons as list to be selected from and Exit reason-designation as field to be selected from. The field to be saved is Exit reason.

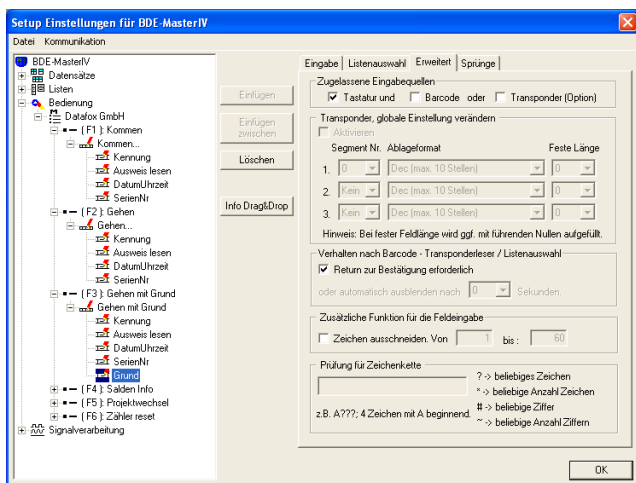


Figure 161: Expanded characteristics of Reason

Under Expanded you have to select keyboard as permitted input source and to activate the option Return necessary for confirmation. The other options are not used.

Here you can apply all pre-settings.

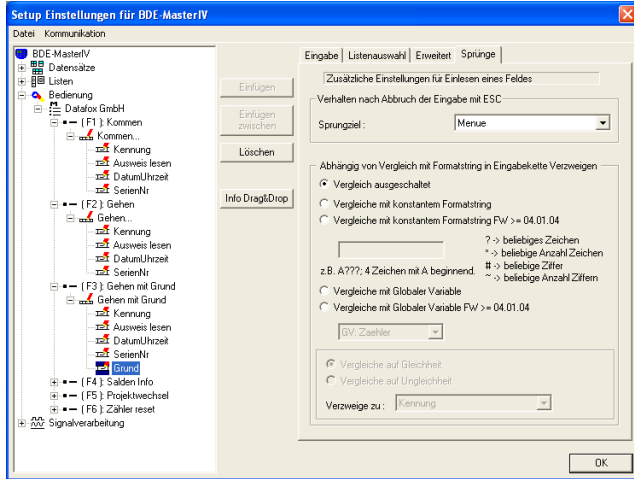


Figure 162: Jump characteristics of Reason

The fourth input chain is named Query info:. You do not assign a data record description, because this input chain is only used to show the accounts, but not to create a data record. Add 2 fields.

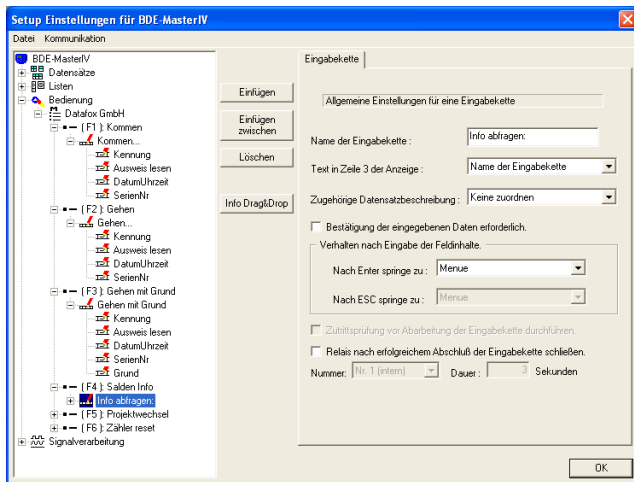


Figure 163: Settings of the input chain Query info:

The first field is named Read card. You did not assign a data record description. Therefore no data record field can be assigned. Set the field function Normal. The maximum input length is not limited.

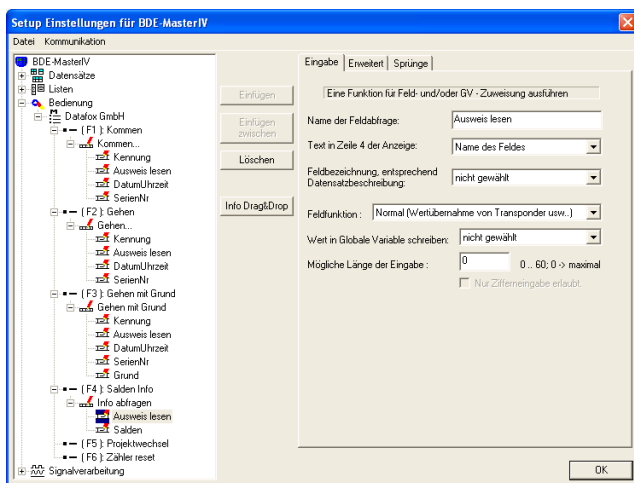
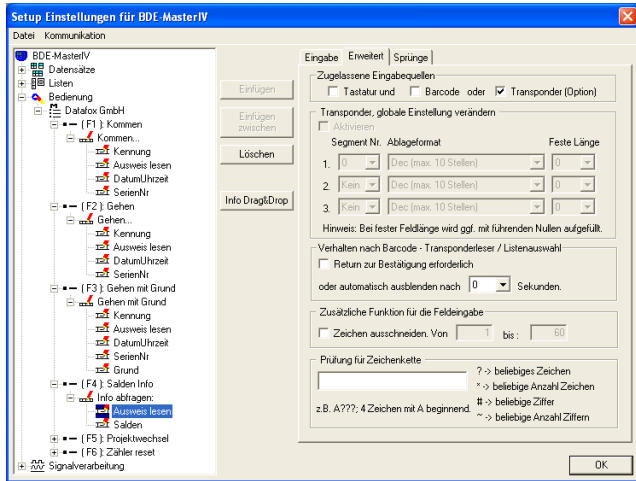
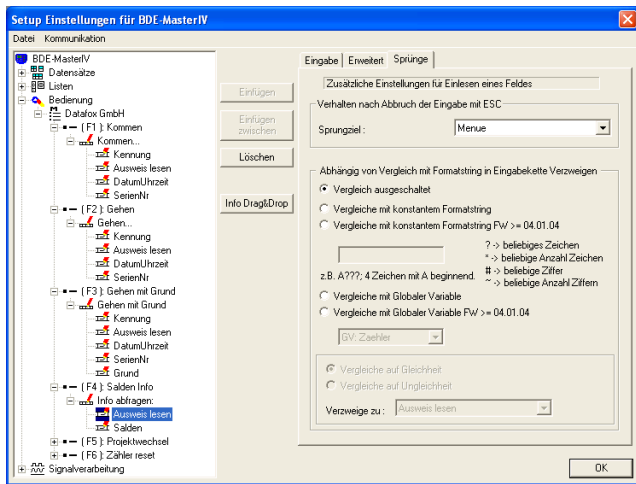


Figure 164: Configuration of input Read card



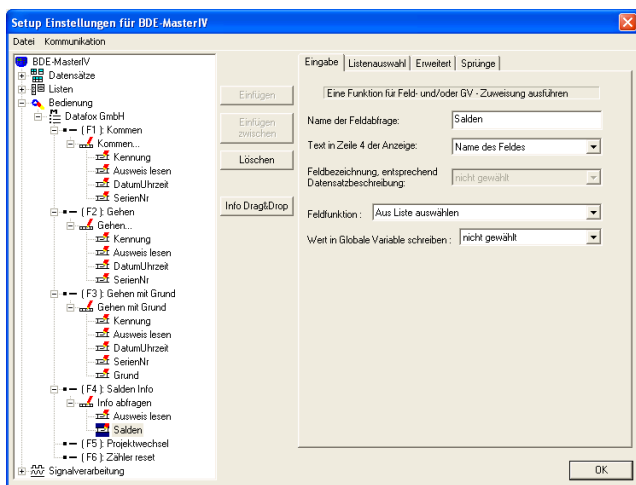
Under Expanded you have to select transponder as permitted input source and to deactivate the option Return necessary for confirmation. Set the time for fading out automatically to 0 seconds.

Figure 165: Expanded characteristics of Read card



You do not need any jumps here. Therefore you can apply the pre-settings.

Figure 166: Jump characteristics of Read card



The second field is named Accounts. Again you cannot assign a data record field. Because you want to read account information out of the list Account selection, you have to set the field function Select from list.

Figure 167: Configuration of the input Accounts

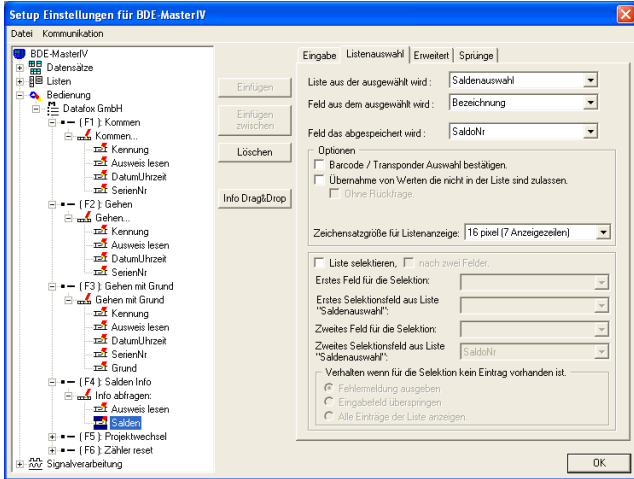


Figure 168: List selection of Accounts

At first you have to select the list, containing the necessary information under List to be selected from. So please assign the list Account selection here. Under Field to be selected from you have to set the field, whose content you want to show on the display later. So please assign Designation here. Select Account-No as field to be saved.

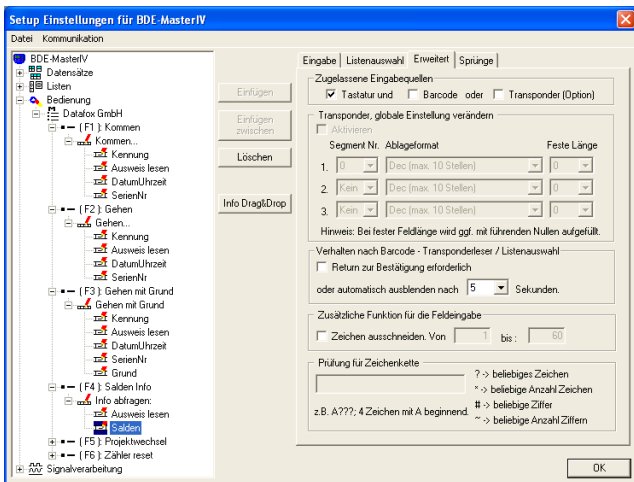


Figure 169: Expanded characteristics of Accounts

On the register card Expanded you have to select keyboard as permitted input source and to deactivate the option Return necessary for confirmation. The time for fading out automatically is equivalent to the display duration of the account information on the terminal. Here you recommend a time of 5 seconds.

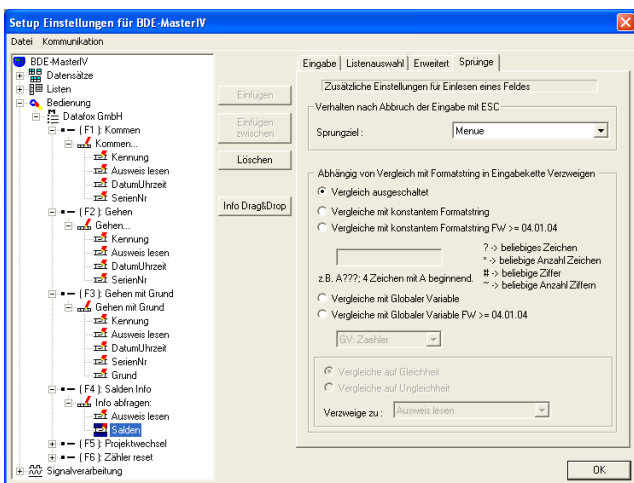
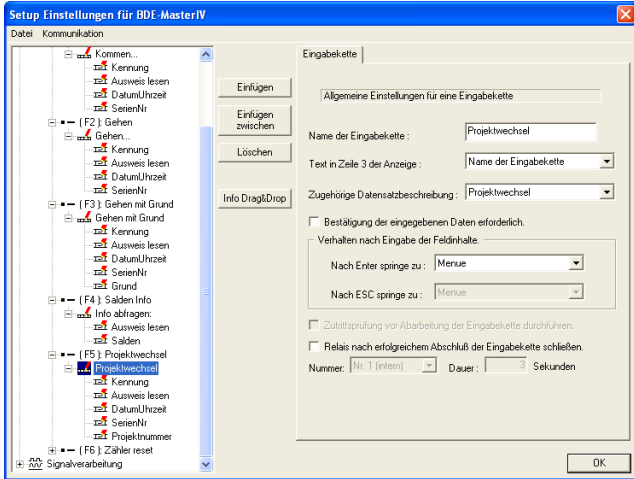


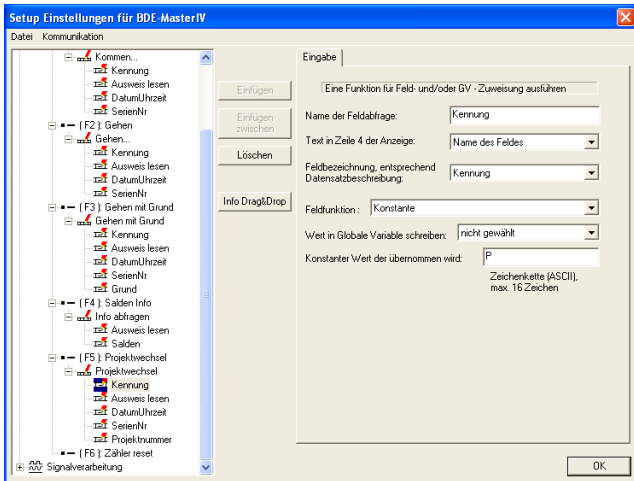
Figure 170: Jump characteristics of Accounts

The jump characteristics are of no use here.



Mark the next input chain and name it Project change. Assign the same-named data record description. Confirming the data and controlling a relay after finishing the input chain is not necessary. Add 5 input chain fields to the input chain.

Figure 171: Settings of the input chain Project change



The first field is named Identification. Assign the same-named data record description and set the field function Constant. Select Pc (= Project change) as constant value for identification.

Figure 172: Configuration of the input Identification

The following 3 fields (Read card, Date_Time and Serial-No.) are identical to their counterparts of the input chain Entry... Please apply the settings of the figures 150 - 154.

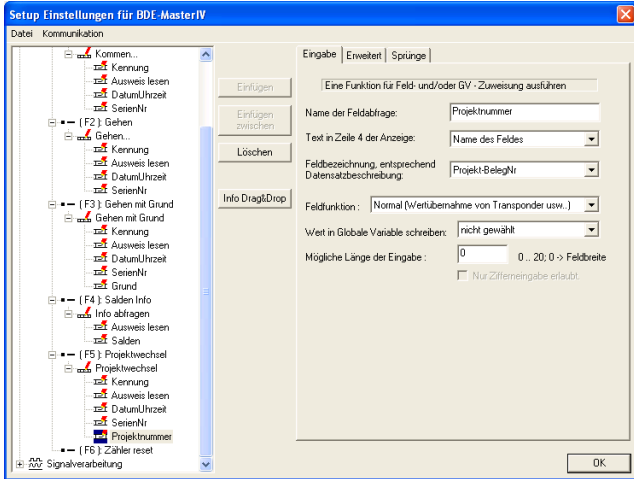


Figure 173: Configuration of the input Project-No.

The last field of the input chain is named Project number and is assigned to the data record field Project record-no. The projects are given in a list (in form of bar code). That means, you need the field function Normal. The maximum field length of (0) is not changed.

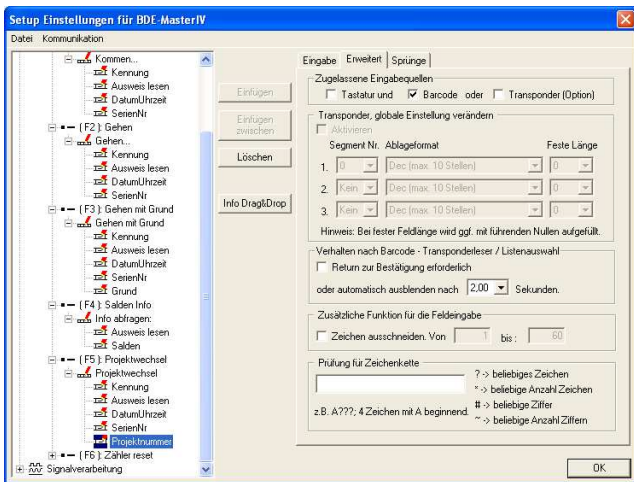


Figure 174: Expanded characteristics of Project-No.

As mentioned, the projects are logged on a bar code list. Therefore you select bar code as permitted input source. Deactivate the option Return necessary for confirmation and set the time for fading out automatically to 2 seconds. That way the read bar code is shown for 2 seconds.

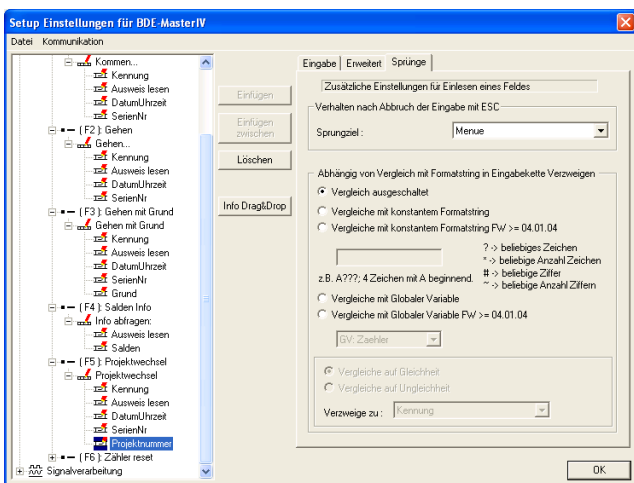
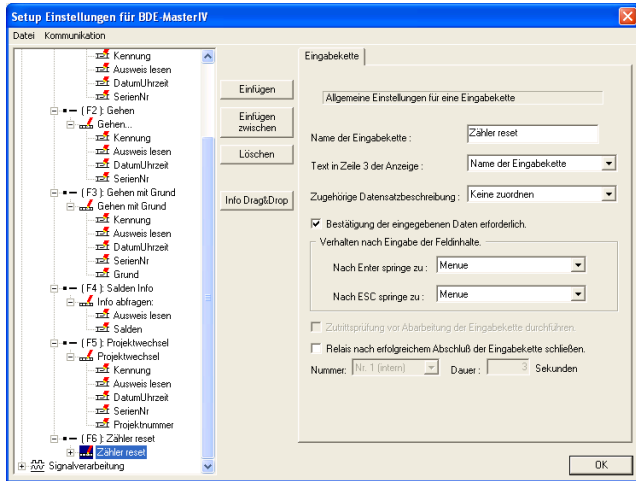


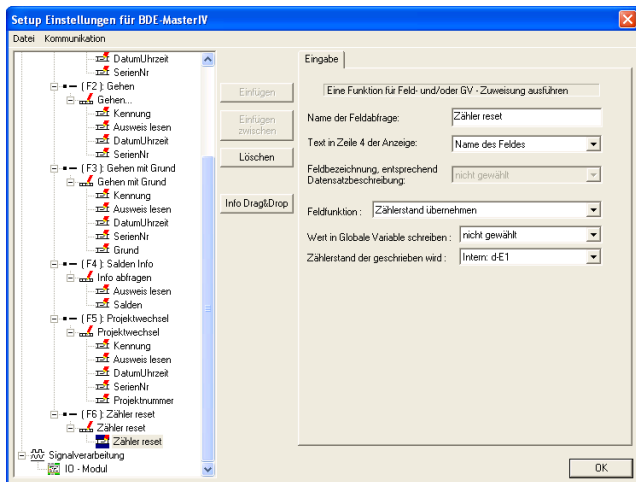
Figure 175: Jump characteristics of Project-No

Jumps are not necessary here.



The last input chain of the operation is named Counter reset. You do not want to create a data record. Therefore you do not assign a data record description. Here you need to confirm the data to avoid unintentional delete. Add one field.

Figure 176: Settings of the input chain Counter reset

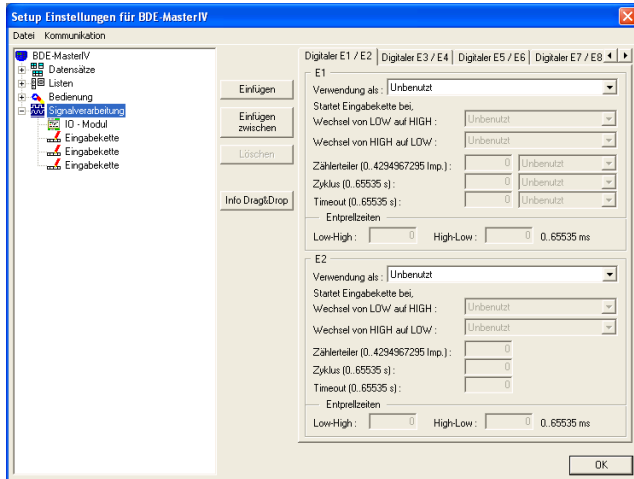


This field is also named Counter reset. Because no data record description was assigned to the input chain, no data record field can be assigned here. You use the field function Apply counter reading. Set the internal digital input1 (d-E1) as counter, whose reading you want to use.

Figure 177: Configuration of the input Counter reset

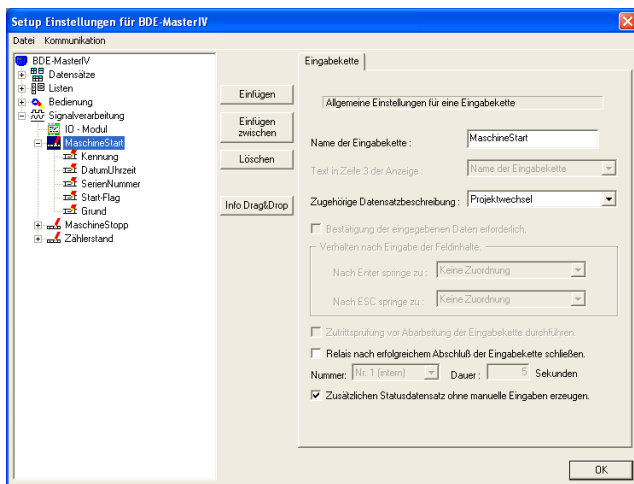
Now the input chains, available on the terminal, are finally configured.

In order to collect switching-on and -off of the machine and the number of produced pieces, you have to create 3 input chains for the signal processing.



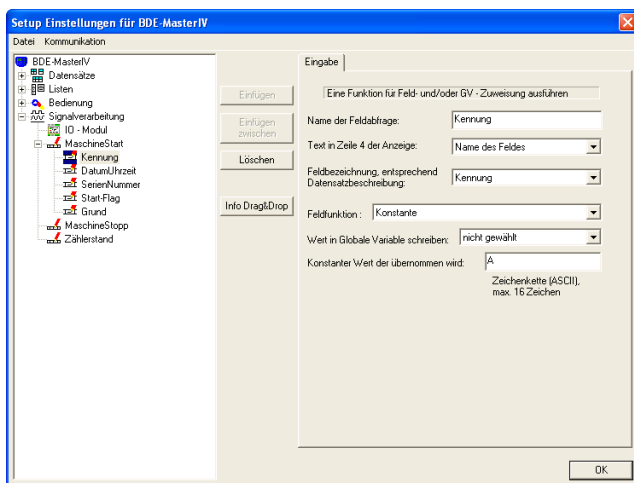
Open the register card Signal processing and add 3 input chains (by clicking on Paste).

Figure 178: Creating the input chains of the signal processing



Click on the first input chain. You can configure the input chain on the right side now. Enter Machine start as name of the first input chain and assign the data record description Project change. Furthermore the option Create additional status data record without manual inputs has to be activated. Then please create 5 input chains fields for Machine start.

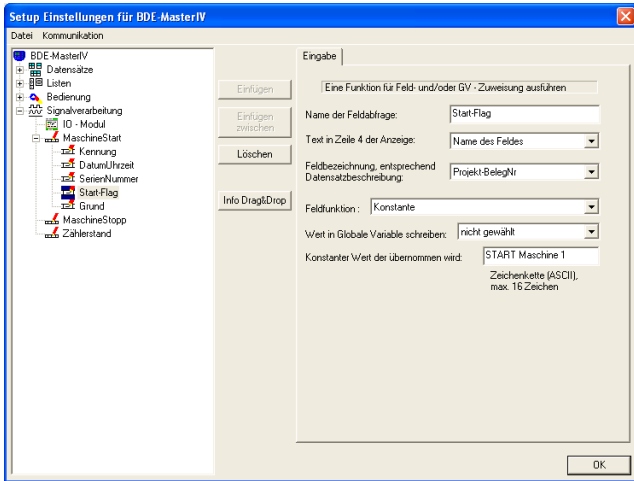
Figure 179: Settings of the input chain Machine start



The first field is again used to identify the data record and therefore named Identification. Assign the same-named data record field. Select the field function Constant and set A as constant value.

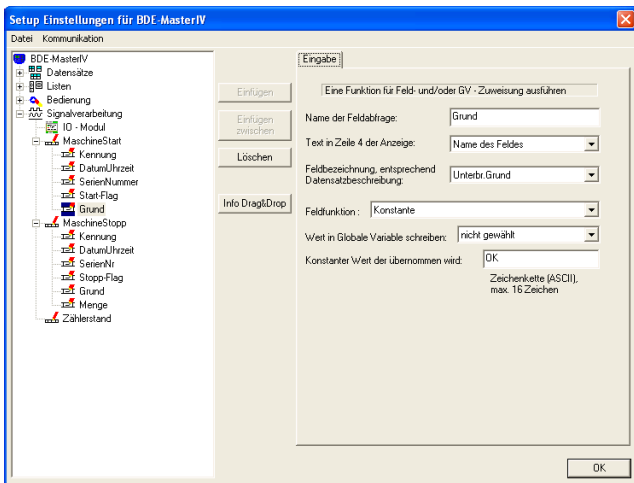
Figure 180: Configuration of the input Identification

The following 2 fields (Date_Time and Serial-No.) are identical to their same-named counterparts used in the input chain Entry.... Please apply the settings of the figures 153 - 154.



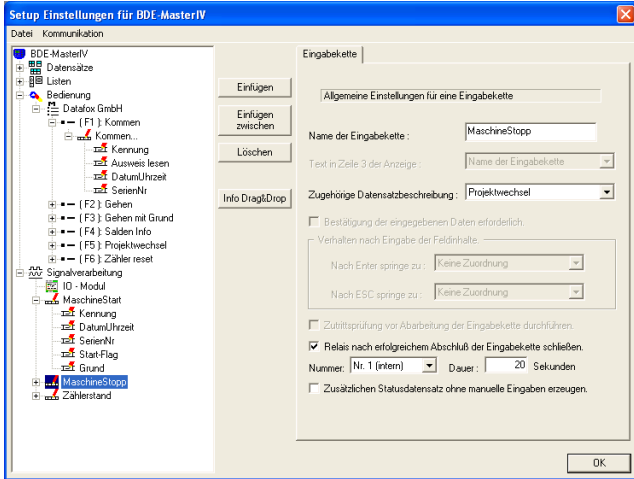
The fourth field is named Start-Flag and assigned to the data record field Project record-no. Select the field function Constant and set the constant ASCII string START Machine 1.

Figure 181: Configuration of the input Start-Flag



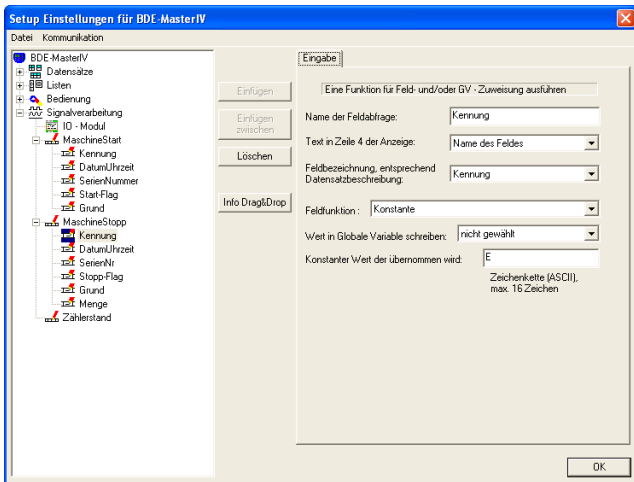
The last field of Machine start is named Reason and assigned to the data record field Stopping reason. Select the field function Constant and set OK as constant.

Figure 182: Configuration of the input Reason



Click on the next input chain and enter Machine stop on the right side. The appropriate data record description is Project change. You activate the option Close relay after successful conclusion of input chain and select relay no. 1 as relay to be switched off for 20 seconds. Add 6 fields to the input chain by clicking on Paste six times.

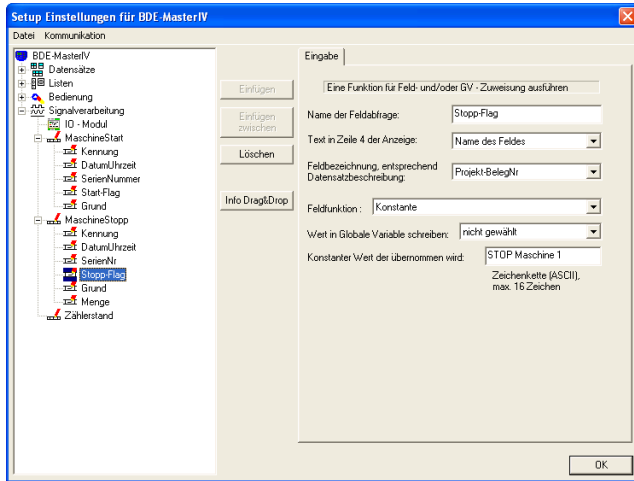
Figure 183: Settings of the input chain Machine stop



The first field (Identification) is identical to the same-named fields used in the other input chains (except for the constant value (E)).

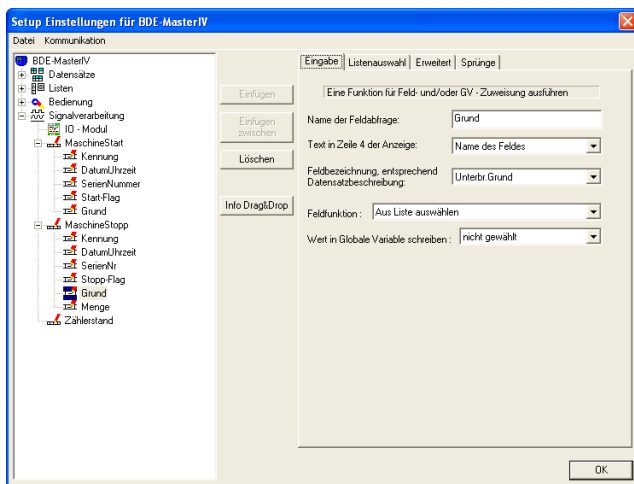
Figure 184: Configuration of the input Identification

The following 2 fields (Date_Time and Serial-No.) are identical to their same-named counterparts used in the input chain Entry... Please apply the settings of the figures 153 - 154.



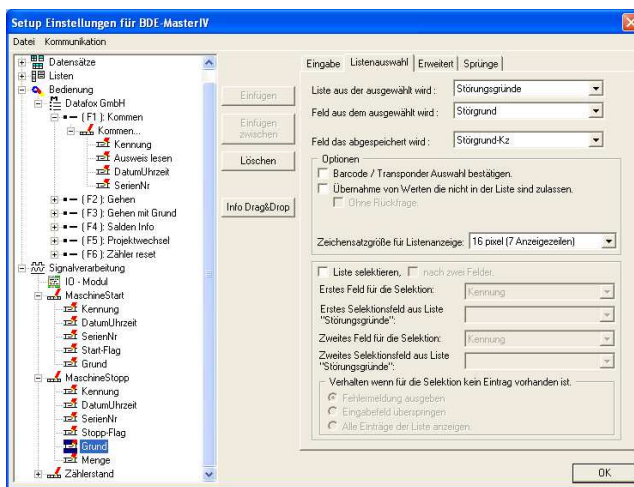
The next field is named Stop-Flag. Assign the data record field Project record-no. and select the function Constant. Set the string STOP Machine 1 as constant value.

Figure 185: Configuration of the input Stop-Flag



The fifth field is named Reason. The appropriate data record field is Stopping reason. You want to select the reason for break from the list Reasons of disturbance. Therefore you need the field function Select from list.

Figure 186: Creating the main menu



The reason of disturbance you want to read out of the list Reasons of disturbance. Therefore you select this list under List to be selected from. The field to be selected from is Reasons of disturbance. Its content is shown on the display after the selection. The field to be saved is Reasons of disturbance-sign. That means, the content of this field is written to the data record field Stopping reason. You do not need to set further settings.

Figure 187: List selection of Reason

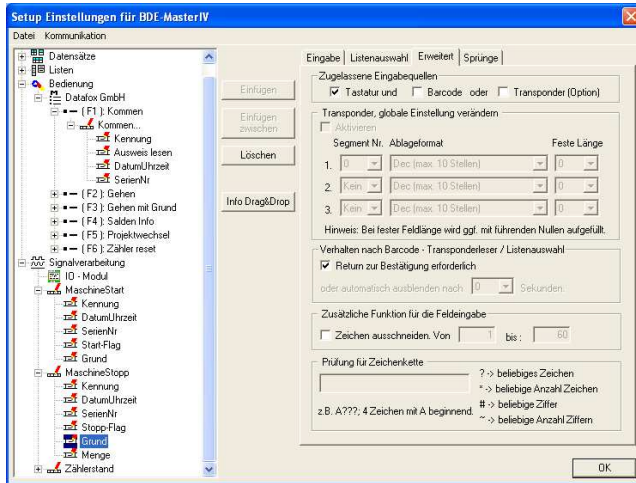


Figure 188: Expanded characteristics of Reason

On the register card Expanded you have to activate keyboard as permitted input source. In order to confirm the list selection you have to activate the option Return necessary for confirmation.

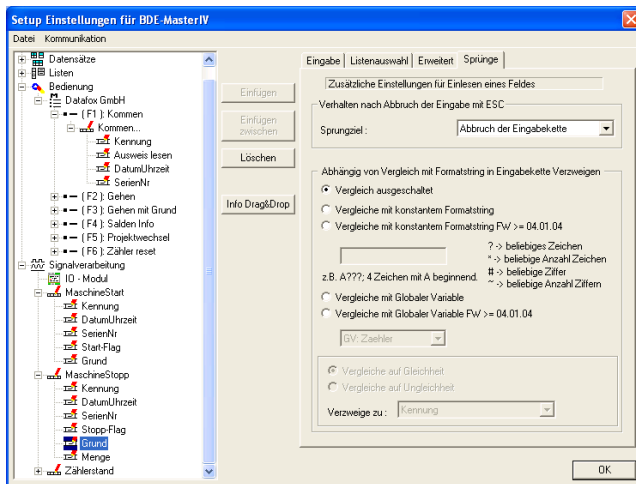


Figure 189: Jump characteristics of Reason

Here you can apply all pre-settings.

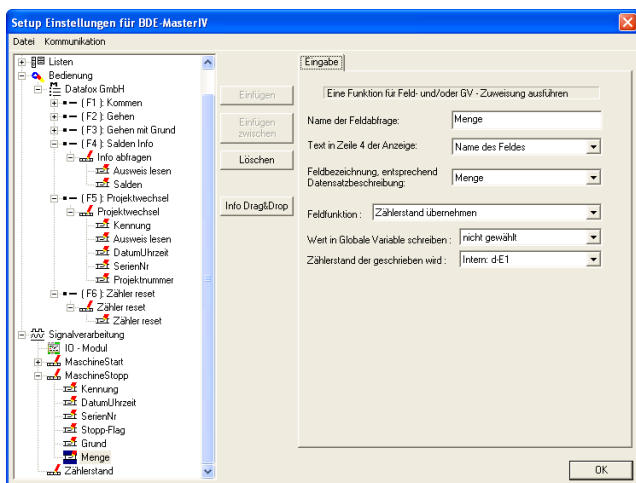
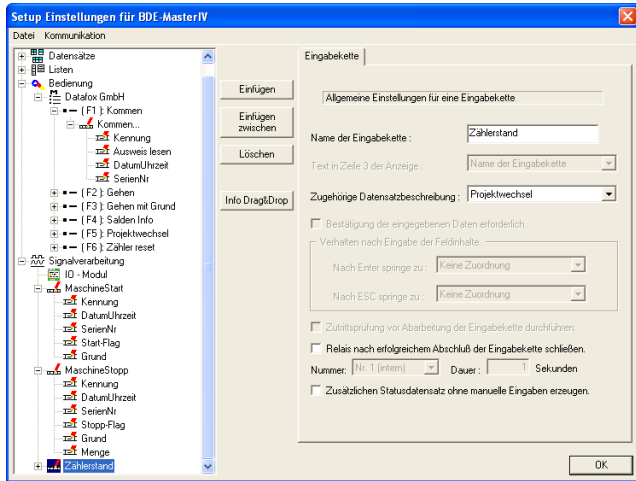


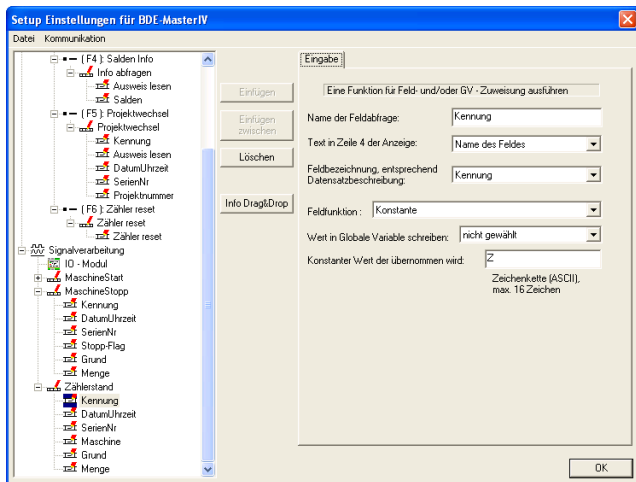
Figure 190: Configuration of the input Amount

The last field (Amount) of this input chain is used to read out the counter reading (the moment of switching off the machine). The appropriate data record field is the field Amount. In order to read out the counter reading of the digital input 1 you need the field function Apply counter reading and set the digital input 1 (Intern: d-E1) under Counter reading to be written.



Mark the last input chain and name it Counter reading. Assign the data record description Project change and deactivate the options Controlling relay and Creating a status data record. Add 6 fields to this input chain.

Figure 191: Settings of the input chain Counter reading



The first field is named Identification and is in accordance to the same-named fields, used in the other data records (except for the constant value (Z)).

Figure 192: Configuration of the input Identification

The following 2 fields (Date_Time and Serial-No.) are identical to their same-named counterparts, used in the input chain Entry... Please apply the settings of the figures 153 - 154.

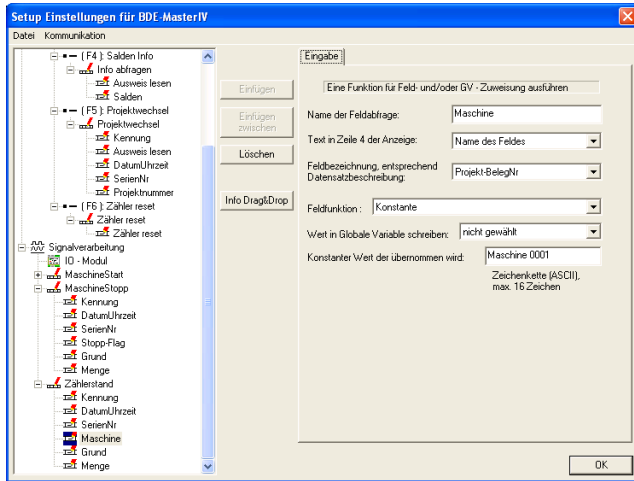


Figure 193: Configuration of the input Machine

The next field (Machine) is used to identify the machine (in case of several machines, that are supervised). The appropriate data record field is Project record-no. You select the field function Constant to write the value under Constant (Machine 0001) as machine identification to the field Project record-no.

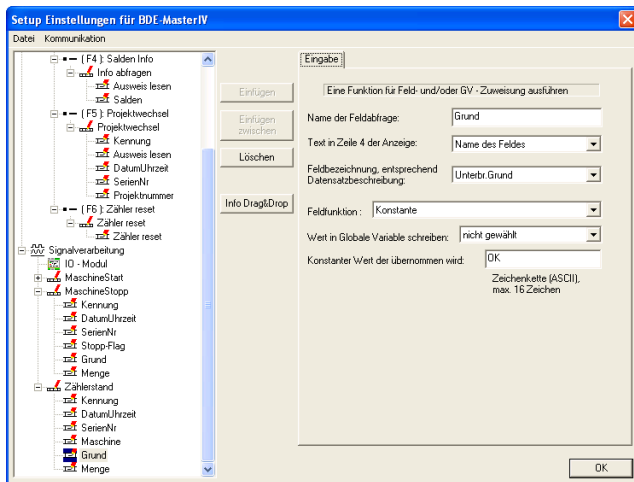


Figure 194: Configuration of the input Reason

Mark the next field and name it Reason. Assign the data record field Stopping reason. Select the field function Constant and set OK as constant value.

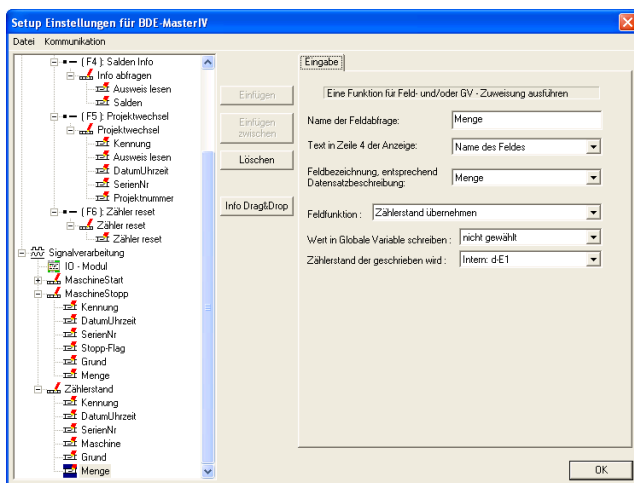


Figure 195: Configuration of the input Amount

Click on the last input chain field now and name it Amount. The appropriate data record field is the field Amount. Set the field function Apply counter reading. Select the Intern: d-E1 under Counter reading to be written and buffer this value under GV:Counter.

Now all input chains are finally configured. In order to use the digital inputs you have to configure their use under Signal processing.

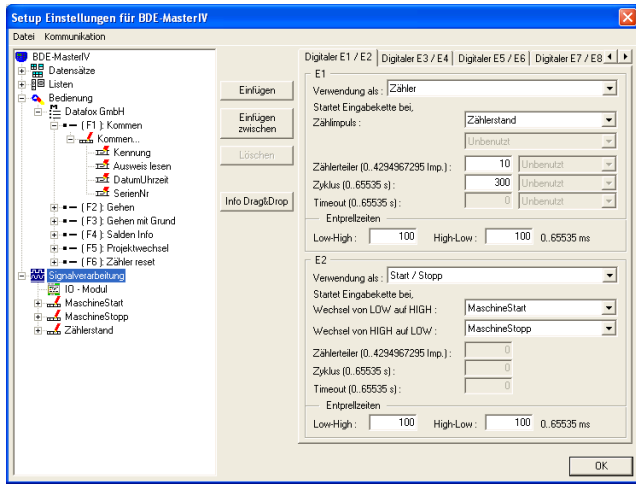


Figure 196: Configuration of the signal processing

Mark the point Signal processing. Now you can configure the inputs on the right side. Assign the use as Counter to input E1 and Start/Stop to input E2. Under E1 you have to assign the input chain Counter reading for the counting impulse. That way you set, how many impulses are collected till the input chain Counter reading is called up. The cycle (300) indicates, in which intervals the input chain Counter reading (irrespective of the counter splitter) is called up. Under E2 you assign the input chain Machine start (change from Low to High (start)) and Machine stop (change from High to Low (stop)). The debounce time is set to 100. The other inputs and the settings for the alive data record are not used in this example.

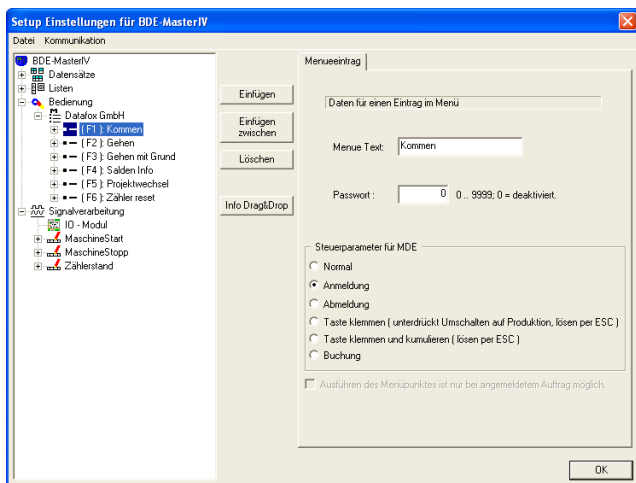
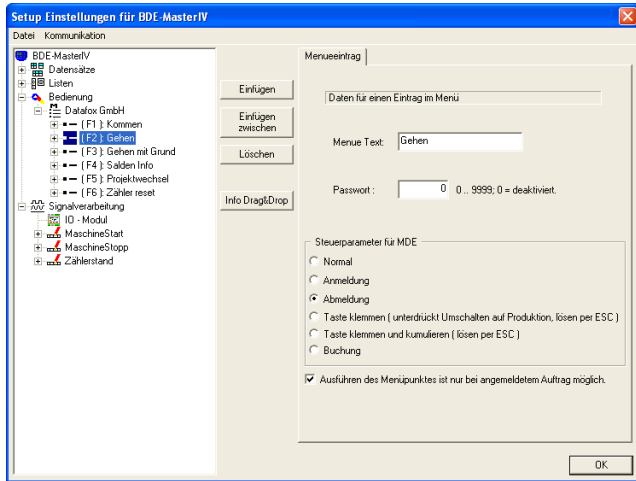


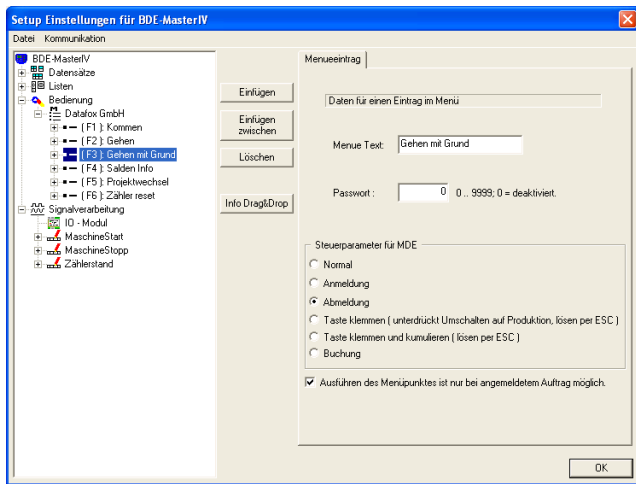
Figure 197: MDE settings of F1

You have activated the operating mode MDE in the basic settings. Therefore you have the possibility to define dependencies between the function keys. In order to do this you have to mark the function key F1 (Entry) first. On the right side you may find the controlling parameters for MDE. Please set Registration there.



You go on to F2 and assign De-registration to it. Activate the option Carrying out the menu item possible only with registered order. That way the input chain Exit... cannot be started before the input chain Entry... was carried out.

Figure 198: MDE settings of F2



The settings of F2 and F3 are the same. So please select De-registration and activate the query.

Figure 199: MDE settings of F3

5.3.1.6 Setup and list transmission

When you have worked through all these steps, the setup is ready. In order to check the booking records, the setup and the lists have to be transmitted to the BDE-MasterIV-terminal.

Connect the BDE-MasterIV to the PC according to the selected communication type. Make sure, that the PC interface is configured appropriately; e.g. baud rate, number of data bits, parity and stop bits of the COM-interface have to correspond to the configuration of the terminal.

Connect the terminal to the voltage source. When the PZE-MasterIV is booted completely, either the message Wait for setup is shown on the display or the BDE-MasterIV is in an active setup.

In both cases it is possible to transmit a new setup with DatafoxStudioIV to the device.

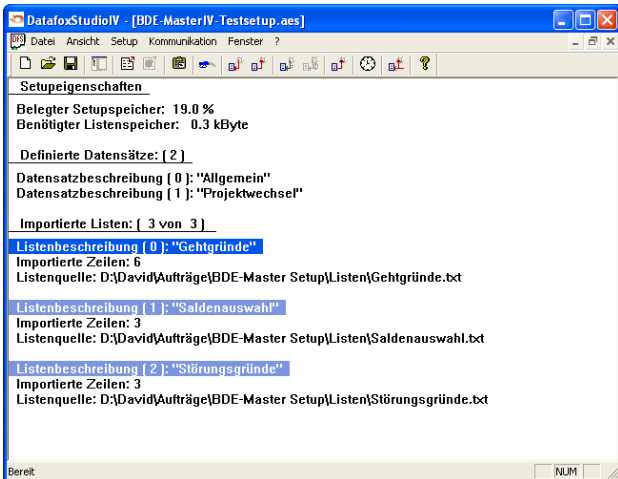


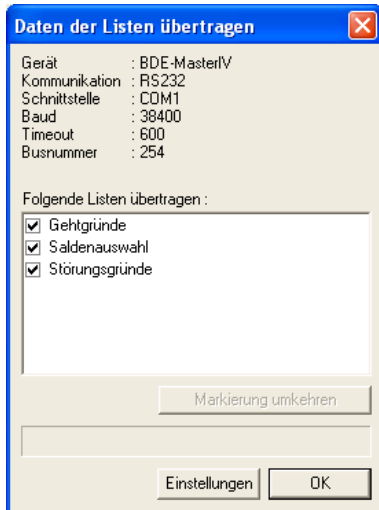
Figure 200: Import of the lists

Import the lists, you have created in chapter ..., to the setup via *< Setup => Listen importieren >*. If the import is finished successfully, the file path is displayed as list source.



Figure 201: Transmitting the setup to the device

Now you can transmit the setup to the device via *< Kommunikation => Setup schreiben >*. The progress bar indicates, that data are transmitted to the device. A successful conclusion of the transmission is indicated by a message you have to confirm via OK.



At last you can transmit the lists to the device via *< Kommunikation => Listen laden >*. Here you can also select, which data shall be transmitted. The progress bar indicates, that data are transmitted to the device. A successful conclusion of the transmission is indicated by a message you have to confirm via OK. Now you can carry out booking records with the terminal.

Figure 202: Transmitting the lists to the device