

# Central Processing Unit for IMT / LKG / PCTAB

## IMT4CPU

### Manual – Operation / Installation



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## 1 General / Basics

The central processing unit IMT4CPU (CPU of system IMT4) as advancement of the CPU-LP of system IMT2000 is used in different applications, e.g. LED indicator board (tableau) and for PC application PCTAB.

The connectors **LED-TAB** for LED driver modules IMT4LED/ IMT4LEDK and I/O-Interface (**I/O-IF**) for digital input / output modules (IMT4IN, IMT4OUT, IMT4REL) is identical to the interface of the prior CPU module version CPU-LP (System2000).

The communication interfaces Modul 1/ Modul 2 are to configure with appropriate plain interface modules to adapt the physical serial interface.

The default serial interface "Modul 1" is designed for standard applications. Normally not all pins at the external connector are used (see applications).

The interface "Modul 2" left unused for default application. It is reserved for special applications using more interfaces.

The RS485 interface is normally used for distributed LED indicator panel applications using the slave processor IMT4PROC. This interface will be also used for IMT4 network applications.

The direct control of LED driver modules (IMT4LED / IMT4LEDK reside near IMT4CPU) via special bus (**LED-TAB**) using 10-pin flat cable. **Note:** the number of driver modules and LED is reduced by comparison to CPU-LP !

I/O extension using I/O modules (inputs IMT4IN or outputs IMT4OUT, IMT4REL) are connected via special bus (10-pin flat cable) to interface connector **I/O-IF** at IMT4CPU.

Programming of module IMT4CPU will be done via USB interface.

Do not connect unused pins / terminals !

### Startup / Commissioning

With firmware startup (power on or key RESET) LED 1 ... LED 4 used as flags of initial phases. At end of init procedures all LED simultaneously on. After this all LED are off.

**Note:** LED1 and LED2 are used for serial interface diagnostics. DIP1+2 select the interface these dig LED are valid for – 00 = Module 1, 01 = Module 2, 10 = RS485-interface and 11 = USB-interface. LED1 flashes when any serial data received and LED2 flashes when any serial data transmitted. These LED flashes with each data byte regardless if correct data, baudrate, parity etc. – they are diagnostic flags for any data bytes !

When no data transferred with alarm system failures in wiring or programming (protocol, baudrate, parity, etc.) are possible causes of error. The firmware timeout detection will control the blinking LED 4 (0,6 s on, 0,6 s off).

Configuration errors (application specifics) will cause permanent short piezo pulses – the configuration data do not match the firmware – actualize configuration or firmware.

With successful start up and communication with panel LED 4 flashes with distance of 3 s.

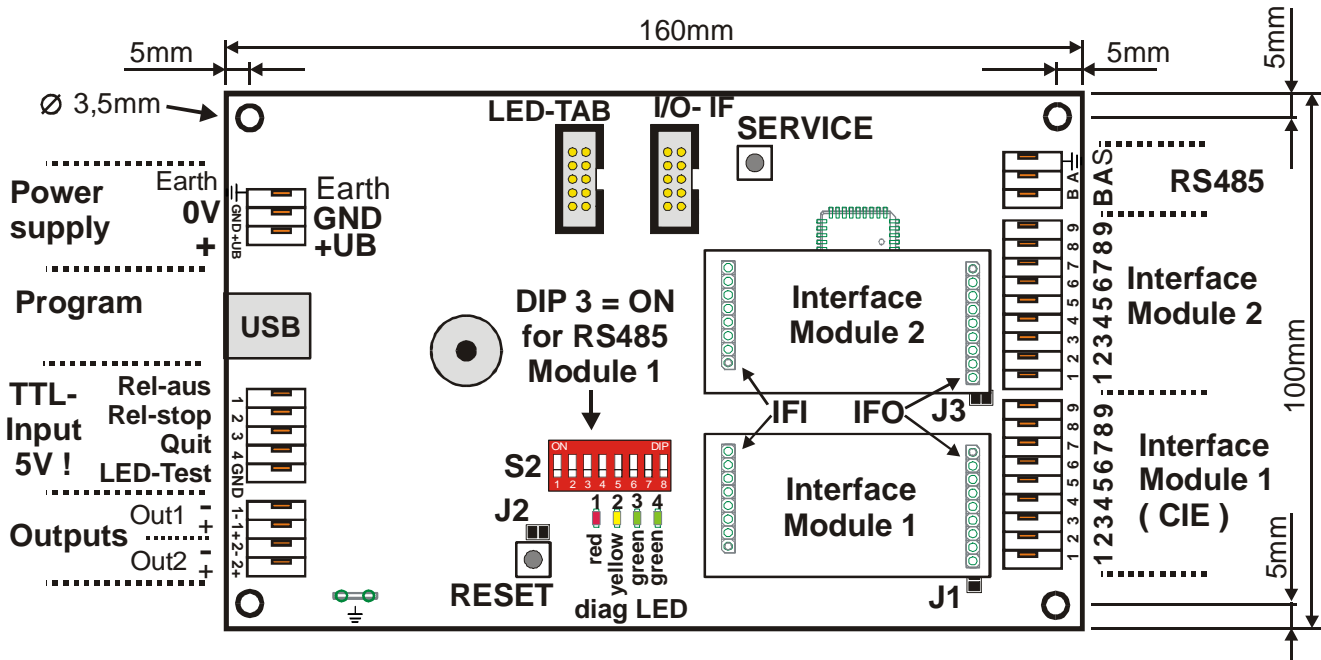
## 2 Installation instruction

### 2.1 Mounting and connection overview

Dimensions of IMT4CPU module: 160 mm x 100 mm (Europe format).

For mounting: 4 drill holes - 3,5 mm diameter

All connectors are plug in able terminal blocks (WAGO, female terminal block, 0,4 - 0,8 mm<sup>2</sup>).



Picture 1 : Connections and dimensions

### 2.2 Diagnostic LED

LED	Colour	Meaning
LED 4	green	<i>off</i> – no error, okay, no power supply <i>blinking (0,6 s on, 0,6 s off)</i> – CIE / alarm system protocol erroneous / disturbed <i>Flashing (0,1 s on, 3 s off)</i> – CIE / alarm system protocol okay
LED 3	green	<i>off</i> – no error, okay
LED 4 + 3	green / green	<i>both LED flashing invers (0,9 s on, 0,1 s off)</i> – Bootloader active (Firmwareupdate)
LED 2	yellow	<i>irregular on/ off</i> – Transmit data flag of serial interface (TxD)
LED 1	red	<i>irregular on/ off</i> – Receive data flag of serial interface (RxD)

Table 1: LED diagnostic displays

## 2.3 Soldering Jumper

Jumper	Type	Meaning
J1	Soldering Jumper	internal GND – external GND of Module 1 interface
J2	Soldering Jumper	open, reserved (disable watchdog)
J3	Soldering Jumper	internal GND – external GND of Module 2 interface

**Table 2: Soldering jumper**

## 2.4 DIP switches

DIP switch S2								
DIP8	DIP7	DIP6	DIP5	DIP4	DIP3	DIP2	DIP1	Meaning
-	-	-	-	-	-	OFF	OFF	Diagnostic LED 1/ LED 2 for Module 1
-	-	-	-	-	-	OFF	<b>ON</b>	Diagnostic LED 1/ LED 2 for Module 2
-	-	-	-	-	-	<b>ON</b>	OFF	Diagnostic LED 1/ LED 2 for RS485
-	-	-	-	-	-	<b>ON</b>	<b>ON</b>	Diagnostic LED 1/ LED 2 for USB
-	-	-	-	-	<b>ON</b>	-	-	Module 1 – Data direction control (half duplex)
-	-	-	-	<b>ON</b>	-	-	-	Module 2 – Data direction control (half duplex)
-	-	-	ON	-	-	-	-	reserved for application specific debug
-	-	ON	-	-	-	-	-	reserved (echo from CIE interface to USB)
-	<b>ON</b>	-	-	-	-	-	-	PCTAB/ PCFAT connected via USB not Module 2
<b>ON</b>	-	-	-	-	-	-	-	reserved (internal diagnostic via USB)

**Table 3: DIP switches**

Changing DIP switches DIP3 + DIP4 requires RESET of system by key or power on !

All not dedicated DIP switches are reserved for internal test or debug functions and must be left in OFF state !

**2.5 Assignment of terminal pins**

Module 1 interface act as interface with alarm system.

Module 2 interface will be used for special applications or as PCTAB interface.

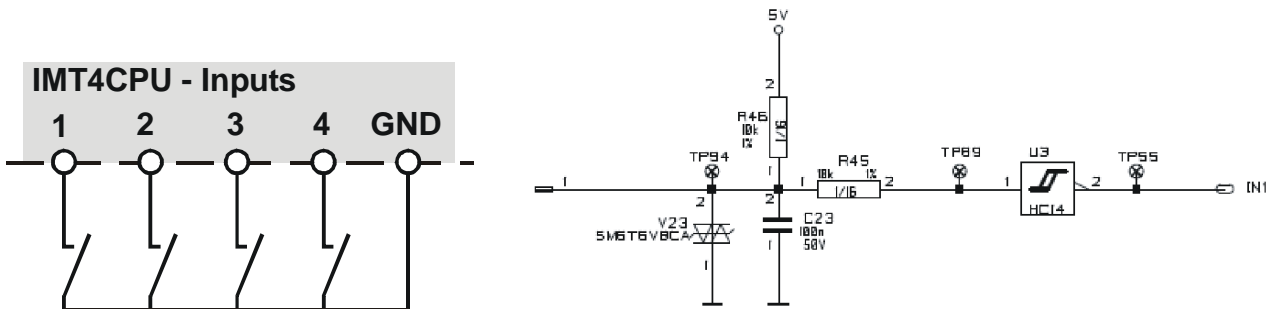
The signal assignments are identical for both module interfaces.

Connector terminals Interface Module 1/ 2									
	1	2	3	4	5	6	7	8	9
<b>Module:</b>	<b>Signal name:</b>								
<b>TTY</b>	GND	TxD+	TxD-	RTS		RxD+	RxD-	CTS	
<b>RS232</b>	GND	TxD		RTS		RxD		CTS	
<b>RS422</b>		TxD+ (A) transmit	TxD- (B) transmit	RTS+ (A) transmit	RTS- (B) transmit	RxD+ (A) receive	RxD- (B) receive	CTS+ (A) receive	CTS- (B) receive
<b>RS485</b>						A (+) Bus	B (-) Bus		
<b>SYSTEM 3000</b>		SIO1+	SIO1-	UB1-	UB1+	SIO2+	SIO2-	UB2-	UB2+

**Table 4: Assignment of connector terminals Module 1/ 2**

Do not connect unused pins !  
 Dependent on module type pins are internal used or bound to GND.

**4 Input signals (TTL) of IMT4CPU are to switch to GND only ! Do not supply with voltage !**

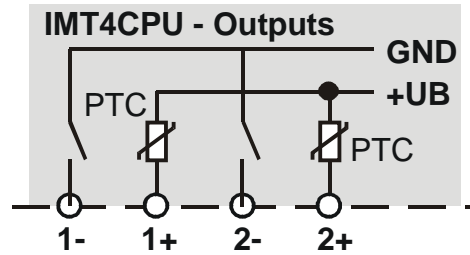


Input connector terminals				
1	2	3	4	5
Input 1	Input 2	Input 3	Input 4	GND

**Table 5: Assignment of input terminals**

Connect push-button or key between „Input“ and „GND“ only !  
**Do not supply inputs with voltage !**

2 Outputs of IMT4CPU are separately used:



Output connector terminals			
1-	1+	2-	2+

Output 1 GND switch	Output 1 high drive	Output 2 GND switch	Output 2 high drive
------------------------	------------------------	------------------------	------------------------

**Table 6: Assignment of output terminals**

Connect external load between „1-“ and „1+“ or „2-“ and „2+“ pin. Output „+“ connected via internal PTC to +UB and output „GND“ switches to ground (0V) for active state.

The internal PTC limits the output current.

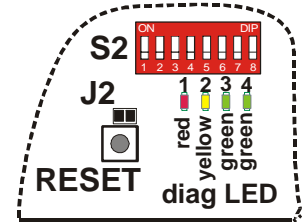
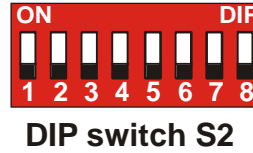
The outputs are enabled for inductive load (self-induction recuperation diode integrated).

### 3 Service / Debug

#### 3.1 Service / Debug LED displays at IMT4CPU

DIP switch 1 + 2 select serial interface debug :

DIP1	DIP2	ser.interface
OFF	OFF	module interface 1
ON	OFF	module interface 2
OFF	ON	RS485 interface
ON	ON	USB interface



- LED 1 (red) : serial data byte received, may be correct or erroneous data / format
  - LED 2 (yellow): serial data transmitted
  - LED 3 (green): off
  - LED 4 (green): flashing = okay      blinking = no or wrong communication / no protocol
- Note : LED1 + LED2 flashes when data byte received / transmitted for about 50ms

#### 3.2 Debug Commands via USB

Programming of IMT4CU is carried out via USB interface. The programming software "ImtProgWin" is part of delivery or can be downloaded from our homepage.

This interface is also used for service and debug operation by using a terminal program.

**Attention !** The driver software must be installed before programming the IMT4CPU. This will be done with the "ImtProgWin" installer. Supervise install process to complete all phases as described in the following chapter. Do not use automatic driver installation by Windows® ! Before IMT4CPU programming starts the connection between IMT4CPU and PC must be established.

Manual service or debug commands require a defined format :

1. char:	'/'
2. char:	one or more defined letter ⇒ command
3. – n. char	Parameter
last char	<CR>

Command and parameter are separated with spaces <CR> = Carriage-Return (char 0x0D)

Commands:            (use capital letters)

/LN x <CR> (default)	LED test via IMT4CPU ⇒ "LED-TAB" or RS485 ⇒ IMT4PROC parameter: x = LED-Nr.
/L x y <CR> (special case)	LED test via IMT4CPU ⇒ "LED-TAB" (special case test !) parameter: x=Dat-IC y=DigSeg (hex-values ⇒ LED-Table)
/R x y	Relay (IMT4REL) control parameter: x = Relay No. y = 1 / 0 (on / off)



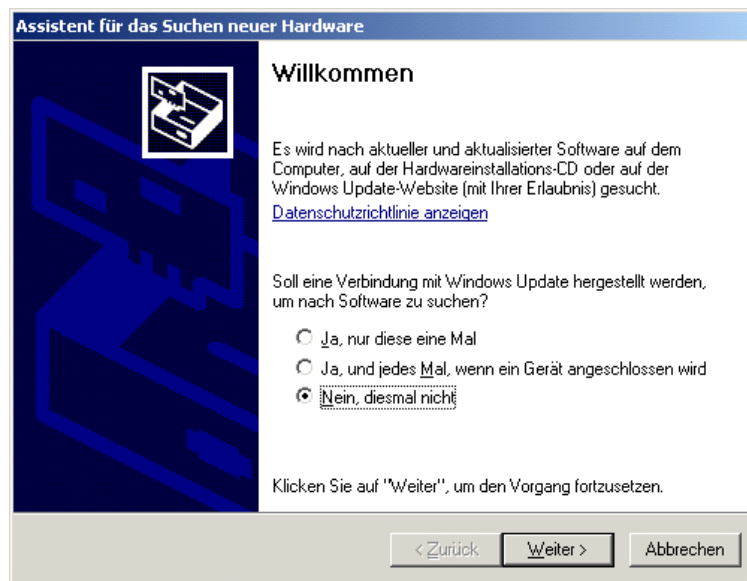
## 4 Programming

### 4.1 Installation USB Driver for IMT4CPU

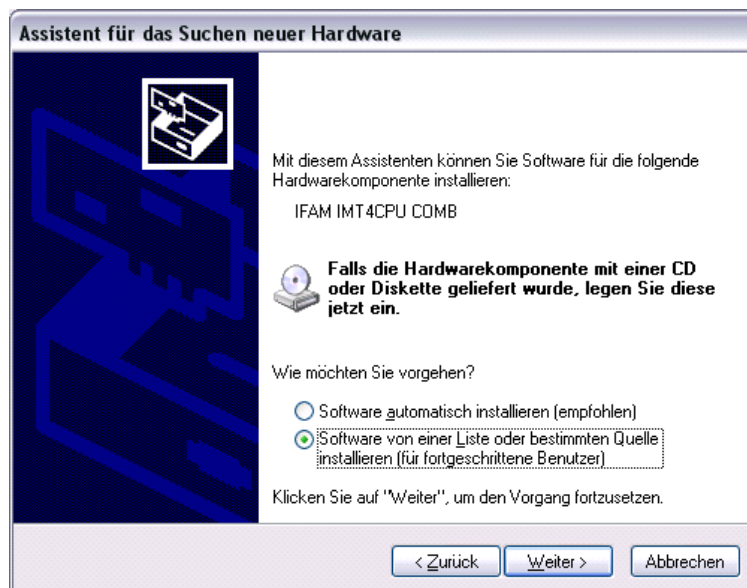
Connecting the module IMT4CPU (power supplied) via USB to the Computer/ Laptop the automatic detection of hardware starts by Windows. Carry out the following instructions for correct installation of the IMT4CPU – USB driver.

The following pictures are the German version of programming software version "ImtProgWin".

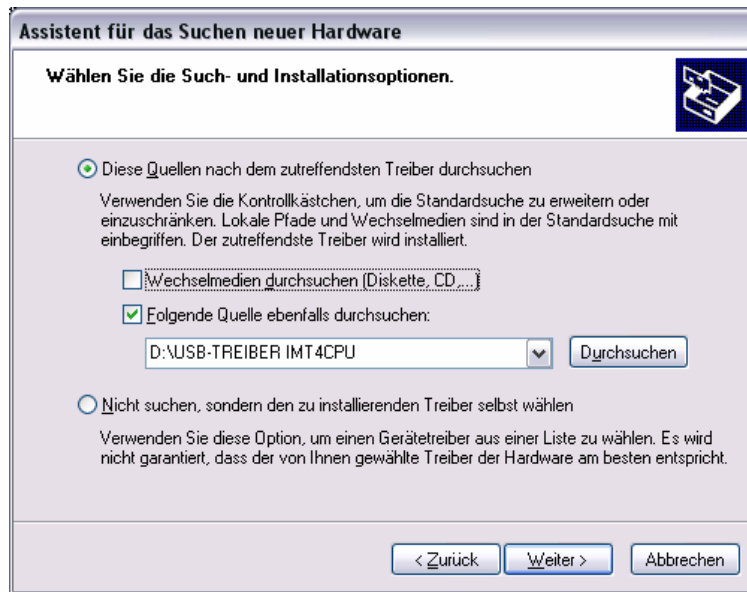
No automatic driver search :



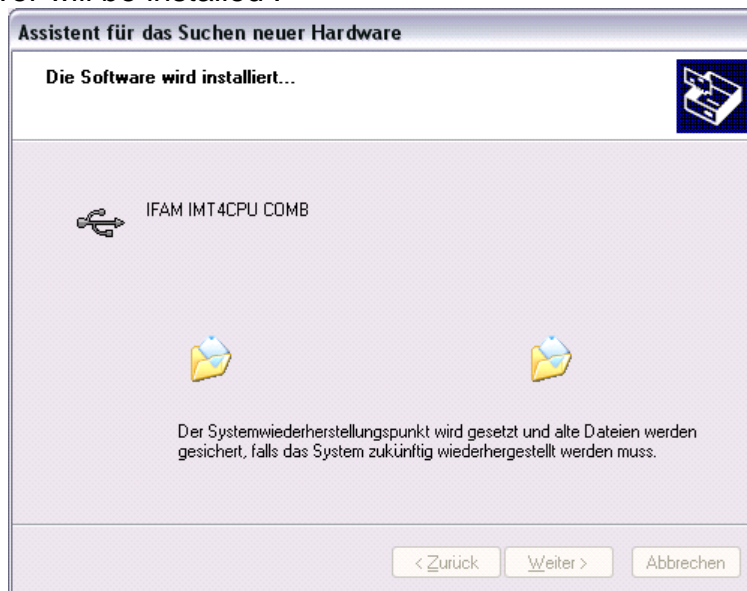
Select search from a dedicated medium:



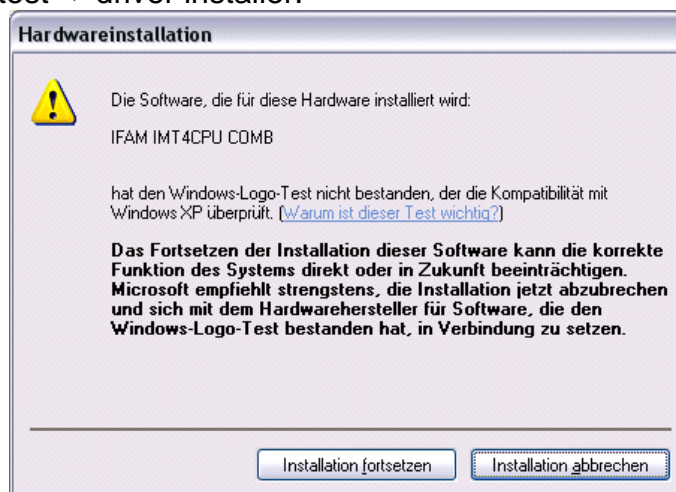
Select path (CD driver path):



Installer starts – driver will be installed :



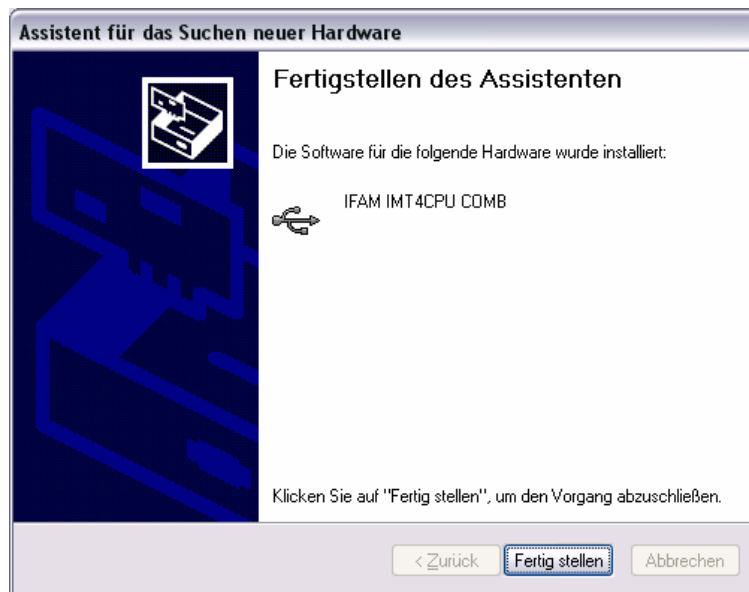
Ignore Windows logo test ⇨ driver installer:



Install USB driver:

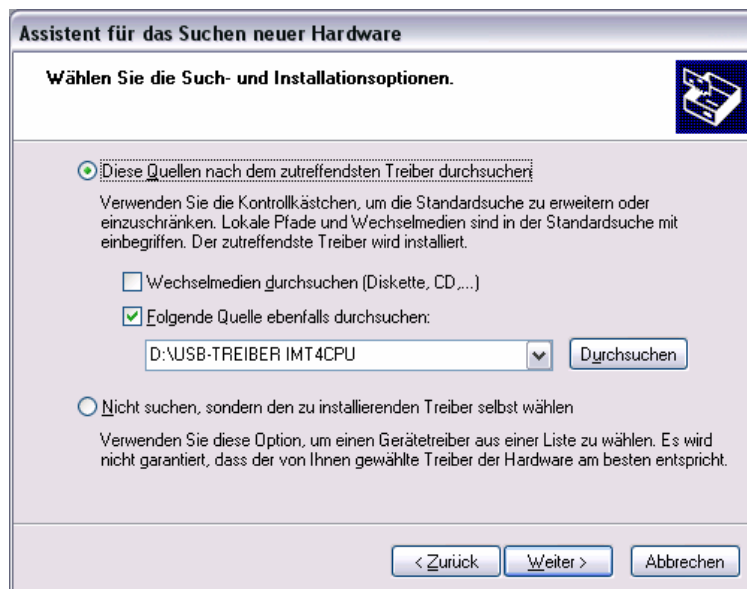
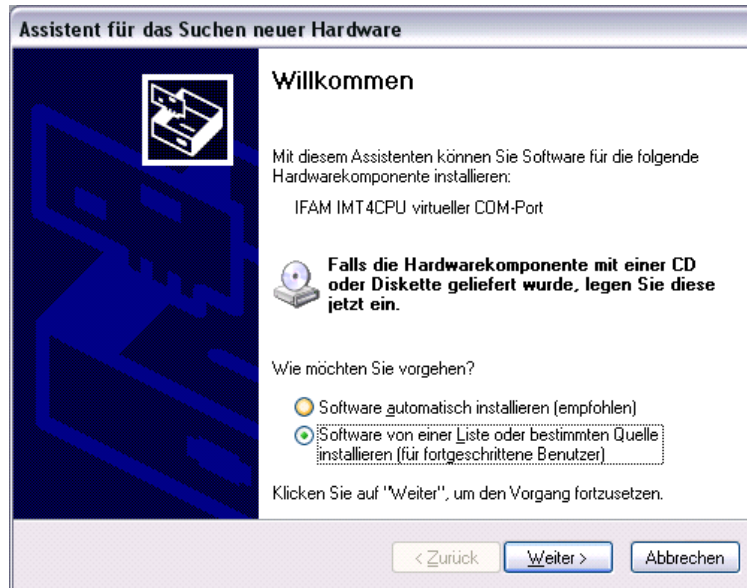


Finish 1<sup>st</sup> phase:

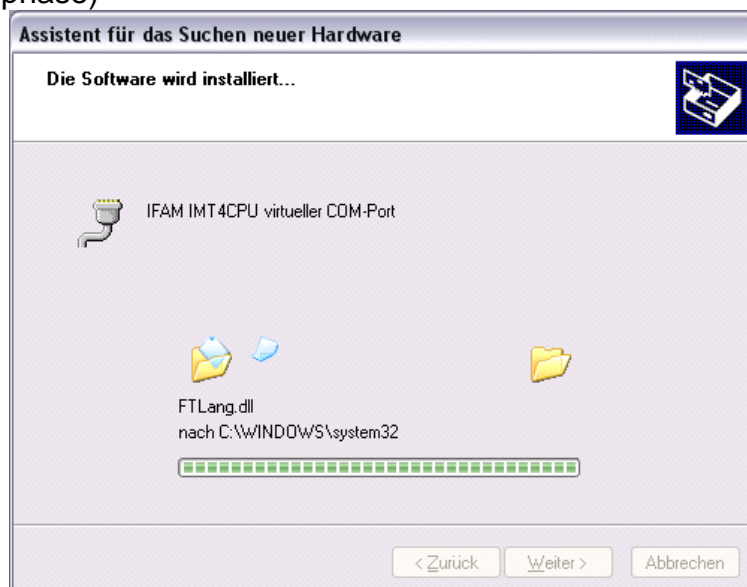


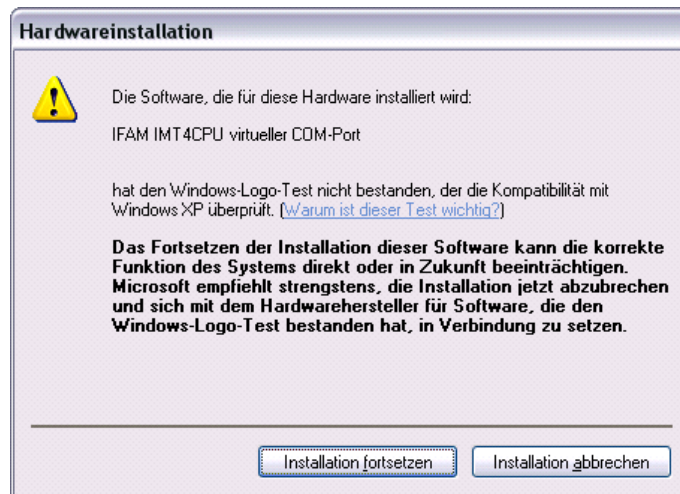
The driver of the USB device is now installed. The installer software will continue automatic and install of a virtual COM port. This interface is needed for IMT4CPU programming.

Select the non automatic Windows search also for 2<sup>nd</sup> phase of installer. Select the same path of data source as before.

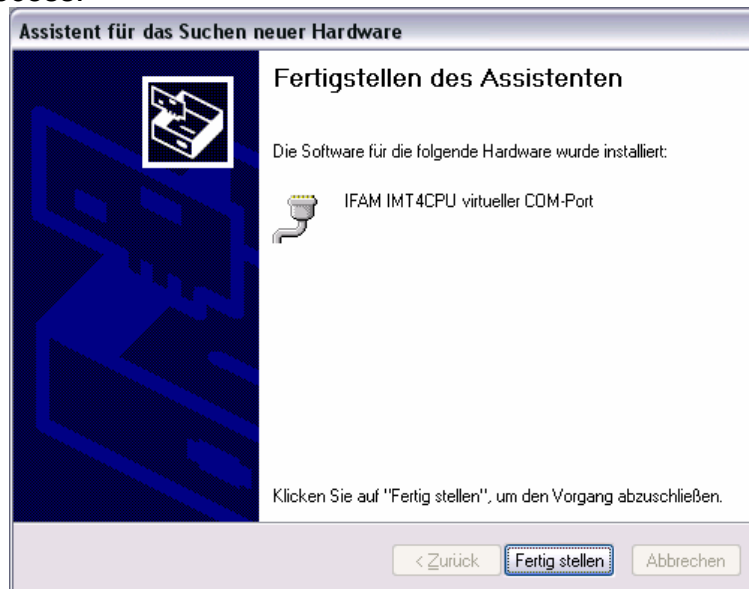


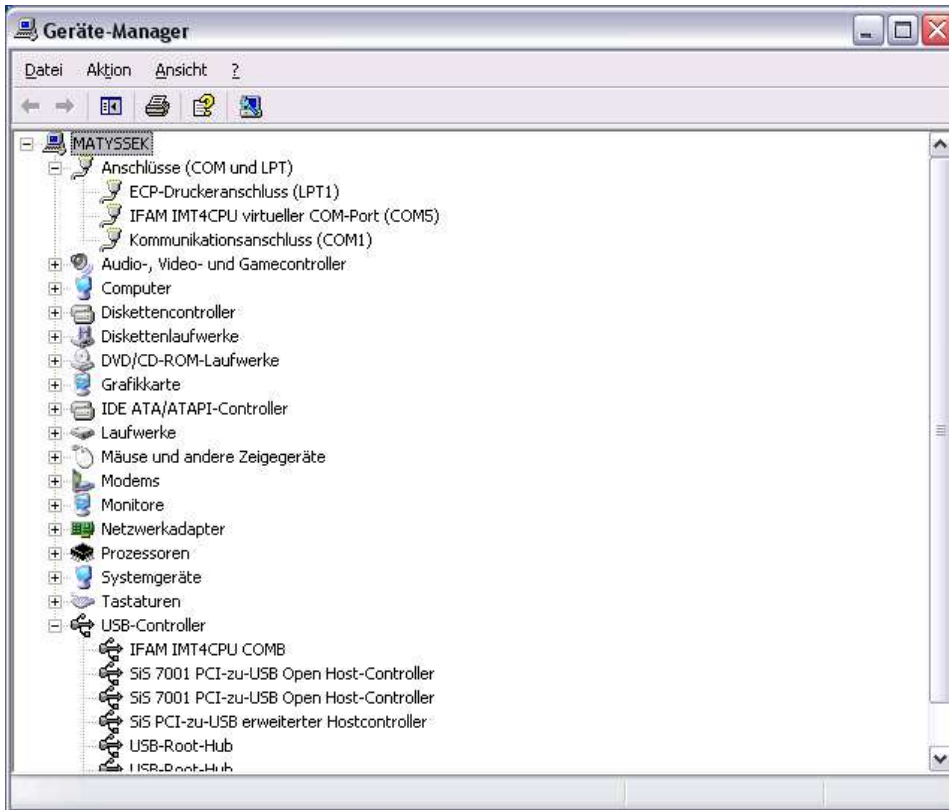
COM interface (2<sup>nd</sup> phase)





Finish the install process:





For communication the virtual COM port "IFAM IMT4CPU is complete installed and available. Before starting programming by software "IMTProgWin" select the according COM port (as example above: e.g. COM5).

Selection of COM port with program start:



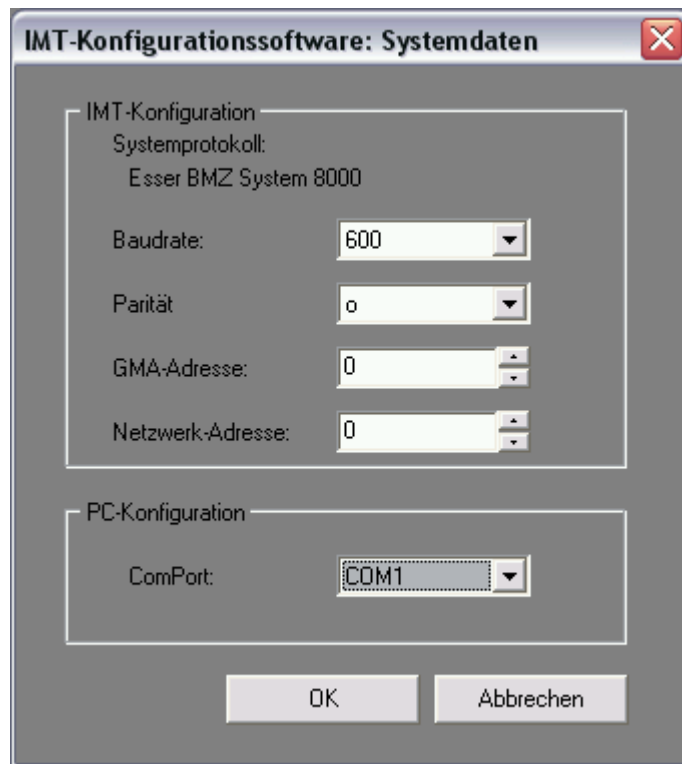
German: "Schnittstelle" = interface

**4.2 Programming of configuration / customer data**

Customer data are stored at PC in a configuration file "\*.cfg" and in flash memory at IMT4CPU. These configuration data can be read from file or from IMT4CPU (data transfer). It is of advantage to save the configuration data in a file stored at PC hard disc etc. to prevent data loss if data read transfer from IMT4CPU device failed.

Using the ImtProgWin Editor you can verify or operate the configuration data. There are two modes for operation in software "ImtProgWin" – "Standardmodus" = default mode dealing with most used data or "Expertenmodus" = expert mode for operating with all customer and system internal data.

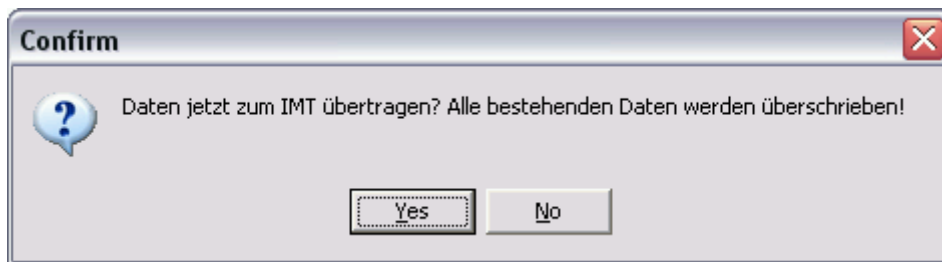
All programming will be done via USB interface (installation described before). It is of importance to select the correct virtual USB – COM interface (see Menu "System data" = „Systemdaten“). Configuration data can be transferred in normal mode or in boot-mode (see firmware update) of IMT4CPU.



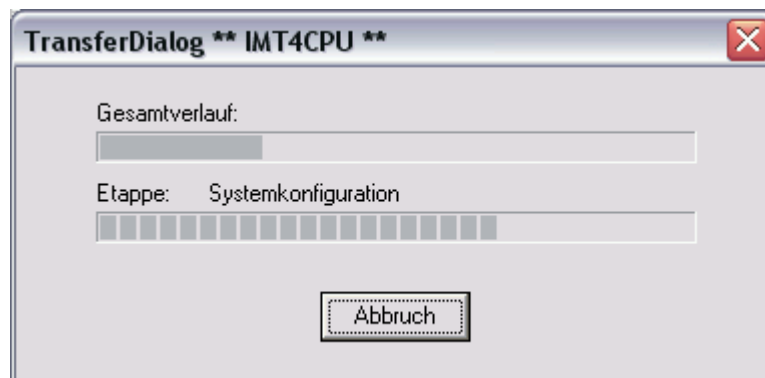
**Picture 2 – Menu "System data" / "Systemdaten"**

Transfer of configuration data between IMT4CPU and PC (read or write) will be started via main menu „Transfer“ (write = "Daten zum IMT übertragen" / read = "Daten vom IMT lesen").

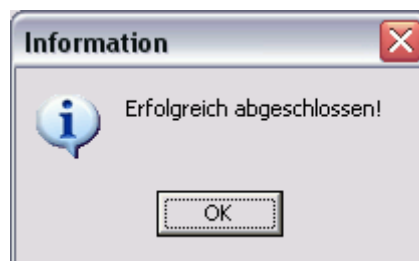




Confirm write data to IMT4CPU with button "Yes" – all data will be cleared and rewritten.  
Watch the write procedure:



Success will be notified with "Erfolgreich abgeschlossen":



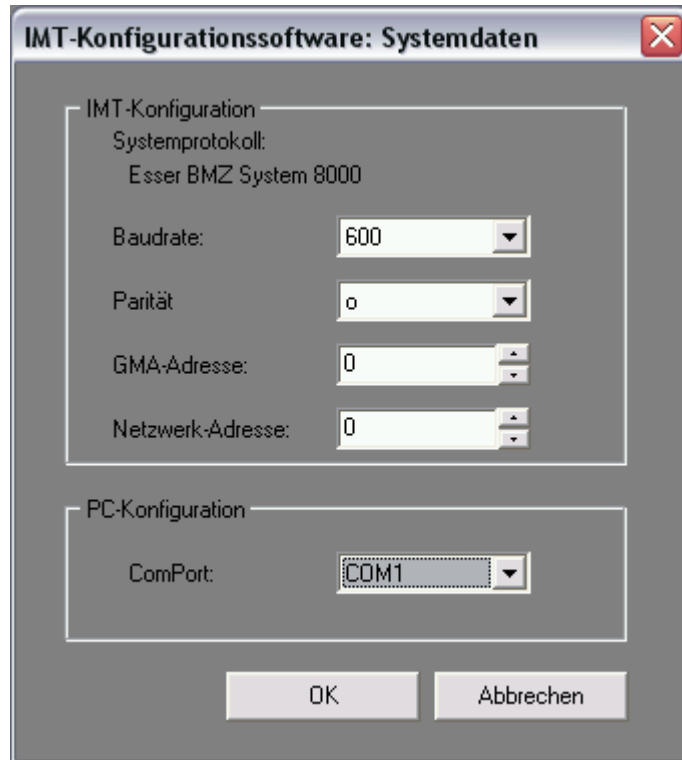
Reset IMT4CPU by pressing the "RESET" button or power off and on.

Note: Actual firmware version will restart the IMT4CPU after configuration data transfer automatically when programming was started in normal mode of IMT4CPU. When IMT4CPU resides in boot mode configuration data and firmware update can be transferred in sequence.



### 4.3 Firmware Update

The firmware is stored in flash memory and can be updated via USB interface by using software "ImtProgWin". Select correct COM interface (USB – COM Port) for data transfer, same as configuration data read/write (see menu "System data" = „Systemdaten“).



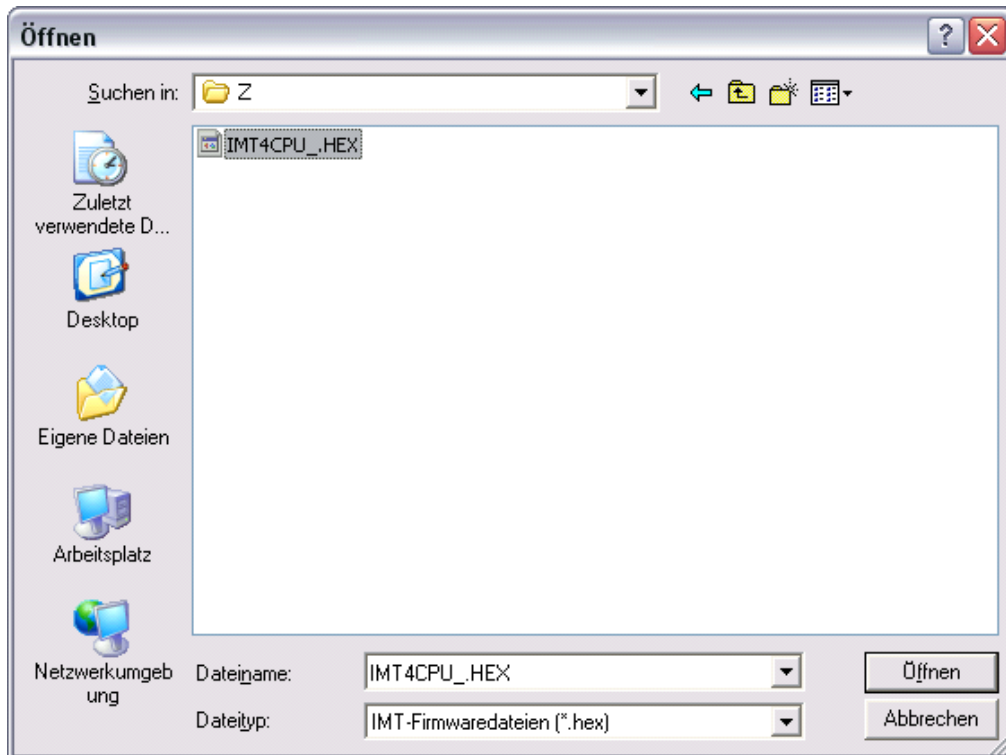
**Picture 3 – Menu System data (Firmware update)**

Before start of Firmware transfer IMT4CPU must be set into "boot mode". This is done by RESET of IMT4CPU with the button "SERVICE" is hold down. After software start you can release the button SERVICE. LED 3 + LED 4 (both green LED) will simultaneous show inversed flash (on – short off) each second. The IMT4CPU has entered it's "boot mode".

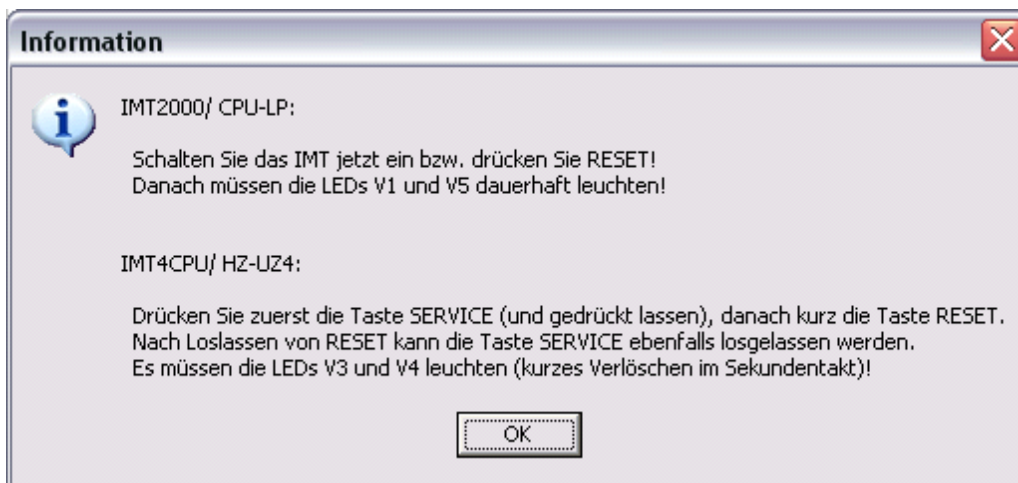
Connect IMT4CPU with PC and start transfer with menu "Transfer" – "Firmwareupdate" of ImtProgWin :



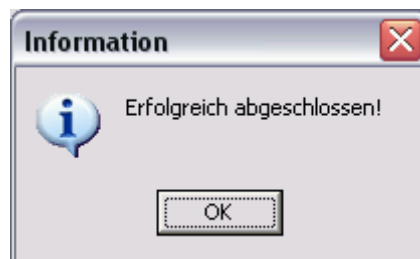
Select firmware file (\*.hex) :



Start transfer with OK – button :



Successful programming will be quitted with :



Reset IMT4CPU by pressing des "Reset" button or with power off / on!

## 5 Technical Data

Power supply	12 V DC or 24 V DC
Operation voltage	10 V DC ... 30 V DC
Integrated voltage control	5V / 1,5 A
Current:	
- quiescent current	approx. 60 mA @ 12 V DC approx. 30 mA @ 24 V DC
Ambient air temperature	0 °C bis 50 °C
Storage temperature	-10 °C bis +60 °C
Dimensions	160 x 100 x 25 mm (L x W x H)
Interfaces:	
Modul 1	CIE interface (interface adapted by plugin module)
Modul 2	Application interface (default not used, plugin module)
RS485	Connector to IMT4PROC modules (distributed tableau) max. 31 Baugruppen IMT4PROC kaskadierbar
USB	Programming / PC connection PCTAB
IO-IF	Connection to IMT4IN, IMT4OUT, IMT4REL – I/O modules
LED-TAB	Connector to IMT4LED, IMT4LEDK modules (LED tableau)
LED-Limits	max. 256 LED via interface LED-TAB max. 8 IMT4LED modules via interface LED-TAB max. 2000 LED programmable (with IMT4PROC applied)
Inputs:	
4 Inputs	for key / switch Low-active with pull-up resistor to 5V
Outputs:	
2 Transistor outputs	+UB/ 0,2 A (self-induction recuperation diode) Open drain type
Miscellaneous:	
2 keys on board	RESET, SERVICE
Piezo	Piezosummer
4 Diagnostic LEDs	green, green, yello, red
DIP switch 8-pin	Configuration, diagnostics, operation mode selct
Clock-IC (RTC)	internal date / time with voltage buffer (Goldcap)

## 6 Contact

There we are:



From A4 and A71 – Slip road "Flughafen" - direction "Flughafen" -  
Business center "Airfurt" – traffic circle slip road Parsevalstraße

From Erfurt city - direction "Flughafen" / Bindersleben -  
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