

# SSW7-USB

700-755-1VK21

## User Manual

Edition 3 / 10.10.2010

HW 6a and FW 3.29 and higher



Order number of manual: 900-755-1VK21/en



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**Note:**

We have checked the content of this manual for conformity with the hardware and software described. Nevertheless, because deviations cannot be ruled out, we cannot accept any liability for complete conformity. The information in this manual is regularly updated. When using purchased products, please heed the latest version of the manual, which can be viewed in the Internet at [www.helmholtz.com](http://www.helmholtz.com), from where it can also be downloaded.

Our customers are important to us. We are always glad to receive suggestions for improvement and ideas.

**Revision history of this document:**

Edition	Date	Revision
3	10.10.2010	Adjustments for USB driver installation

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# 1 Safety Information

For your own safety and for the safety of others, always heed the safety information given here. The safety information indicates possible hazards and provides information about how you can avoid hazardous situations.

The following symbols are used in this manual.



*Caution, indicates hazards and sources of error*



*Gives information*



*Hazard, general or specific*



*Danger of electric shock*

## 1.1 General

The SSW7-USB is only used as part of a complete system.



*The operator of a machine system is responsible for observing all safety and accident prevention regulations applicable to the application in question.*



*During configuration, safety and accident prevention rules specific to the application must be observed.*



*Emergency OFF facilities according to EN 60204 / IEC 204 must remain active in all modes of the machine system. The system must not enter an undefined restart.*



*Faults occurring in the machine system that can cause damage to property or injury to persons must be prevented by additional external equipment. Such equipment must also ensure entry into a safe state in the event of a fault. Such equipment includes electromechanical safety buttons, mechanical interlocks, etc. (see EN 954-1, risk estimation).*



*Never execute or initiate safety-related functions using an operator terminal.*



*Only authorized persons must have access to the modules!*



*During configuration, safety and accident prevention rules specific to the application must be observed.*



*Make sure in the software that uncontrolled restarts cannot occur.*

## **1.2 Restriction of access**

The modules are open equipment and must only be installed in electrical equipment rooms, cabinets, or housings. Access to the electrical equipment rooms, barriers, or housings must only be possible using a tool or key and only permitted to personnel having received instruction or authorization.

## **1.3 Information for the user**

This manual is addressed to anyone wishing to configure, use, or install the SSW7-USB.

The manual tells and explains to the user how to operate the SSW7-USB. It provides the installing technician with all the necessary data.

The SSW7-USB is exclusively for use with a S7-300/S7-400 programmable controller from Siemens.

The SSW7-USB is for use within a complete system only. For that reason, the configuring engineer, user, and installing technician must observe the standards, safety and accident prevention rules applicable in the particular application. The operator of the automation system is responsible for observing these rules.

## **1.4 Use as intended**

The SSW7-USB must only be used as a communication system as described in the manual.

## **1.5 Avoiding use not as intended!**

Safety-related functions must not be controlled via the SSW7-USB alone. Make sure in the software that uncontrolled restarts cannot occur.





*Before you start installation work, all system components must be disconnected from their power source.*

## 2 Installation and Mounting

Installation and mounting must be effected in compliance with VDE 0100 / IEC 364. Because it is an IP 20 module, you must install it in a cabinet. A maximum ambient temperature of 60 °C must be ensured for reliable operation.

### 2.1 Installing the module

With the help of the optional orderable mounting adapter, the SSW7-USB will be snapped on DIN mounting rails. It can be clicked onto the rear of the housing without the use of tools. The holder can also be fixed on a subplate.

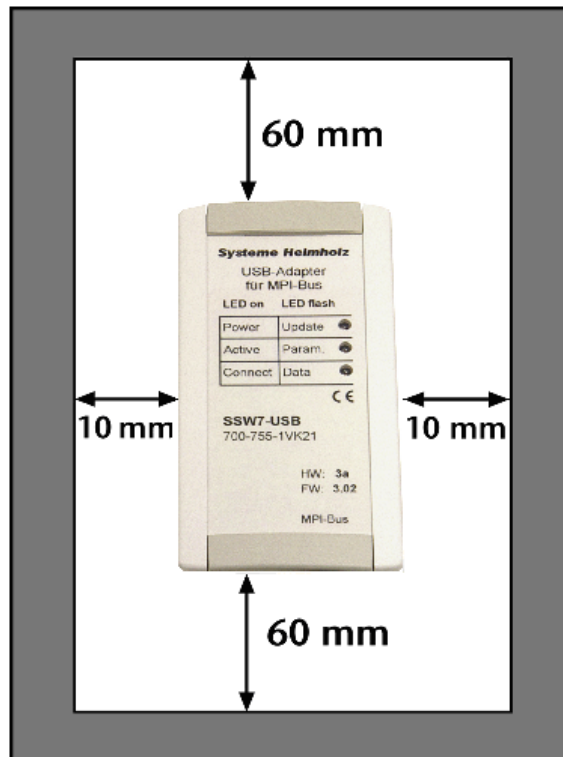
### 2.2 Mounting orientation

The SSW7-USB can be installed in any orientation.

### 2.3 Minimum clearance

Minimum clearances must be observed because

- Then it is possible to insert and remove the SSW7-USB without having to remove other system components.
- There is enough space to connect existing interfaces and other contacts using standard commercial type accessories.
- There is room for any necessary cable routing.



For the SSW7-USB, a minimum clearance of 60 mm must be left above and below and 10 mm at the sides.

## 3 System Overview

### 3.1 Application and function description

The SSW7-USB is a gateway between the USB interface and a MPI bus (RS485-level, 19.2 or 187.5Kbaud).

Up to eight MPI links can be used simultaneously with the USB connection.

At the MPI end, the baud rate to be used is automatically detected. On the USB interface, the baud rate of the connected workstation is also automatically detected.



*FM modules cannot be parameterized with the SSW7-USB.*

The SSW7-USB is an on-site communication device that can be used for MPI, SCADA or visualization system programming.

The MPI connecting cable has a 9-way SubD connector and is 1.2 meters long. The connection is primarily made to an automation system of the S7-300/400er series. Because the SSW7-USB is powered from the PG/PC with the required operating voltage, it can also be connected to any location in the MPI network.

The connection to the PG/PC will be established with an included USB cable.

With the appropriate software, it is possible to use the SSW7-USB as

- A programming adapter (PC adapter), or
- Operator control and monitoring unit

All further information can be found in the manual for each programming software product.

Furthermore, you can perform diagnostics and configurations with the Systeme Helmholtz SHTools software. A free download of the latest version is available on our website [www.helmholz.com](http://www.helmholz.com). Thus, additional functions can be updated at every time on your own.

### 3.2 Connections

The SSW7-USB has the following connections:

- The housing contains a type "B" USB socket. It is recommended to use only USB 2.0 compliant USB cable.
- Sub-D Bus connector without switchable terminating resistor, and a 1.2 m long connecting cable, which is firmly associated with the adapter housing.

### 3.3 LED displays

For display of the operating status, the SSW7-USB has three LEDs.

#### 3.3.1 Status LEDs for standard functions

The LEDs "Power," "Active," and "Connect" provide information about whether and how a SSW7-USB on the MPI bus are functioning.

They also indicate an update process.

State of the LEDs	Power LED (green)	Online LED (green)	Connected LED (green)
Ready for operation	ON		
Actively logged on to the MPI bus	ON	ON	
Active connection with a programmable controller	ON	ON	ON
Data exchange with a programmable controller	ON	ON	BLINK
Transferring firmware update	BLINK	OFF	OFF

### 3.4 Items supplied

The scope of supply of the SSW7-USB includes:

- SSW7-USB ready to use
- 3-meter 4-way USB 2.0 A/B cable
- Manual (German/English)
- CD with driver, parameterization tools, additional information

### 3.5 Accessories

#### 3.5.1 Manuals

Manual, German	900-775-1VK21/de
Manual, English	900-775-1VK21/en

#### 3.5.2 Software

S7/S5 OPC server with USB dongle	800-880-OPC20
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#### 3.5.3 Miscellaneous

DIN mounting rail adapter as an accessory	700-751-HSH01
MPI bus extension cable, 5m	700-751-6VK11
MPI bus extension cable, 10m	700-751-6VK21
MPI bus extension cable, special length	700-751-6SO11

**!**  
*When extending the MPI bus, please follow the relevant configuring guidelines as defined in the documentation of your PLC!*

## 4 Installation of the driver software and service tools

The CD supplied contains various drivers and service tools that have to be used for their respective purposes.

### 4.1 System requirements

To operate the driver and service tools of the SSW7-USB, a PC or laptop is required with a 32-bit Windows operating system and a CDROM drive. The Windows 2000,XP, Vista and Windows 7 operating systems can be used.

In the programming devices or PCs used, there should be one USB interface with the USB 1.1 or USB 2.0 specification.

### 4.2 Installing the USB driver in Windows XP

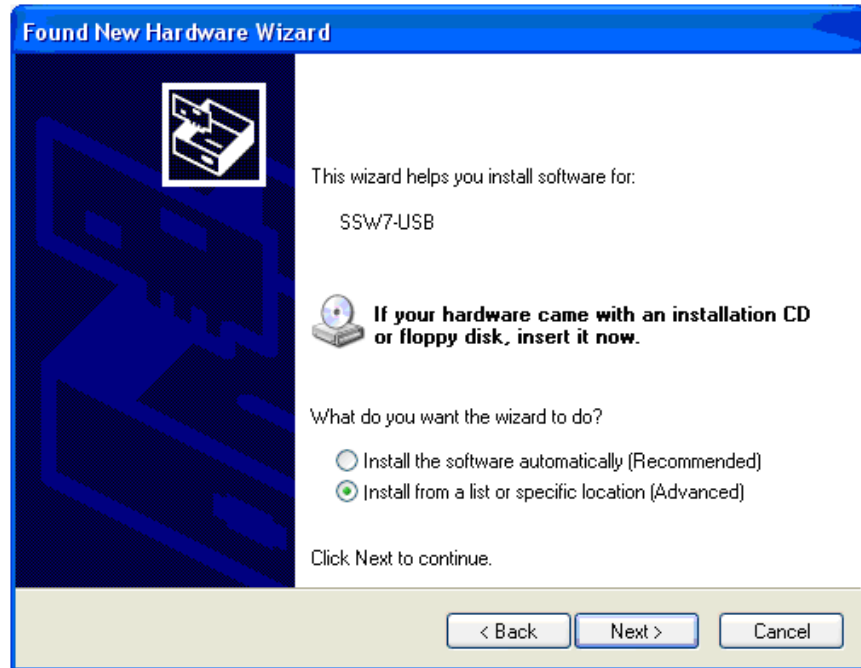
If this is the first time a SSW7-USB is being connected to the PG/PC via USB, the operating system will try to install a suitable driver. The driver is a sort of interface between the USB interface and the operating system (Windows) and has nothing to do with the actual application.

This initialization can take a little time and goes through the following steps:

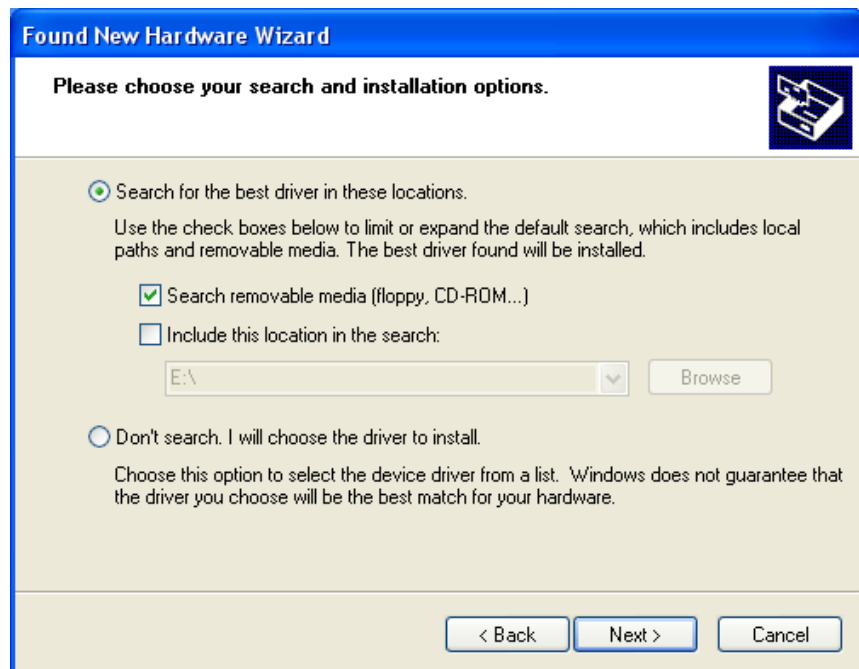
- The operating system starts an installation wizard that performs the installation, which is largely automatic.  
In the first step, you must enter whether the driver is to be searched for online or locally.



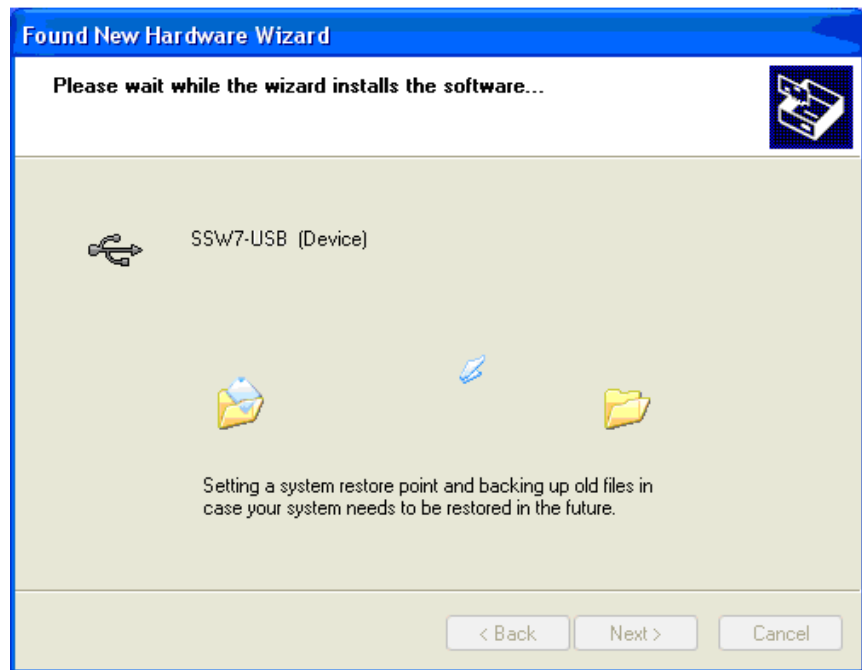
- To be able to specify the search path for the driver (generally the CD supplied), it is necessary to make the following setting and confirm it with “Next.”



- The next step is a prompt to specify the location of the driver. It is generally enough to set a checkmark next to “Search removable media...” and then to click the “Next” button.



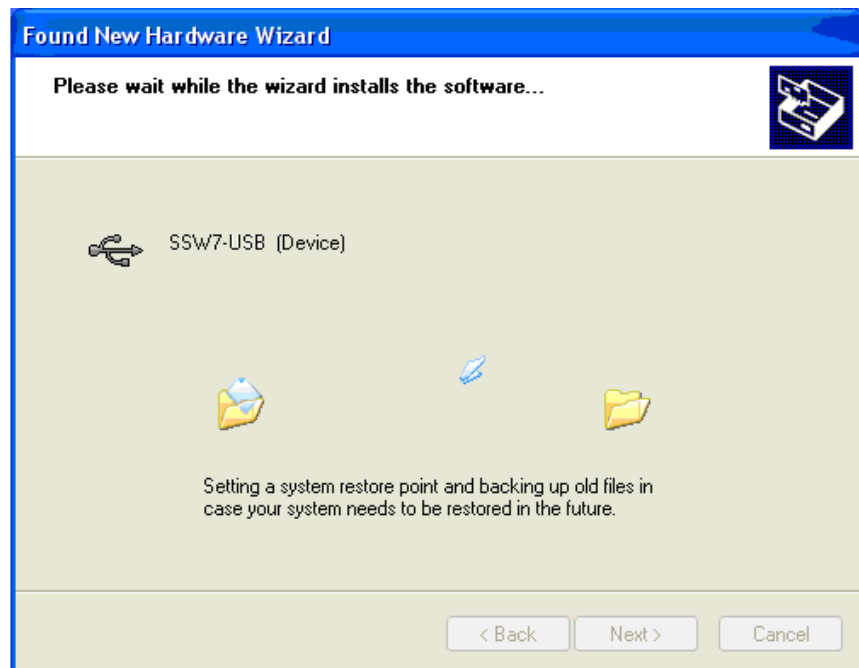
- If the SSW7-Teleservice-Modem CD is in a local drive, the search for the driver now begins.



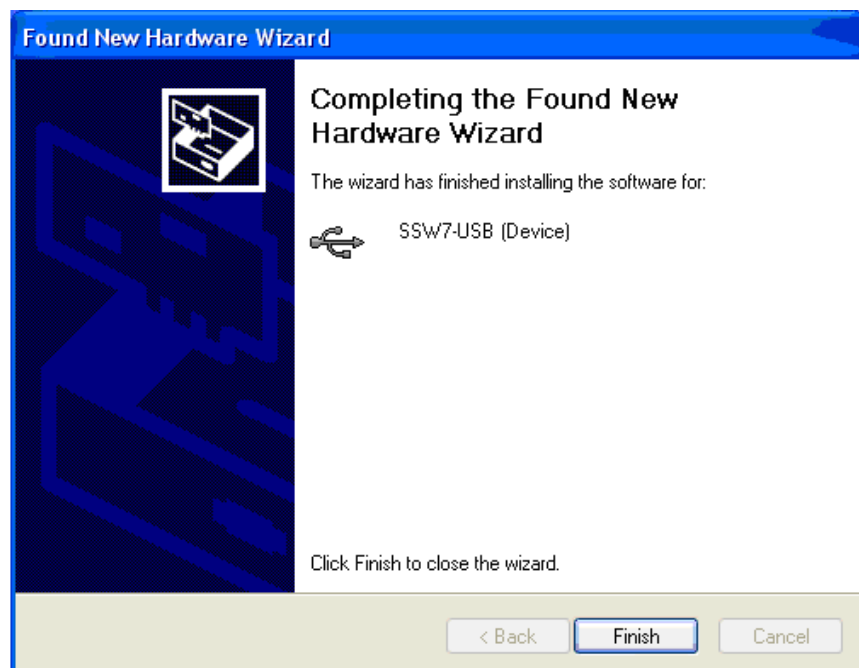
- If the driver is found, a Windows XP logo compatibility query appears.



- Confirm with the button “*Continue Anyway*”. The driver is then installed.



- After successful installation, the operation is completed by clicking the “*Finish*” button.



- The operating system starts the installation wizard a second time to install the virtual COM port driver, too. The installation routine is identical to that described above.

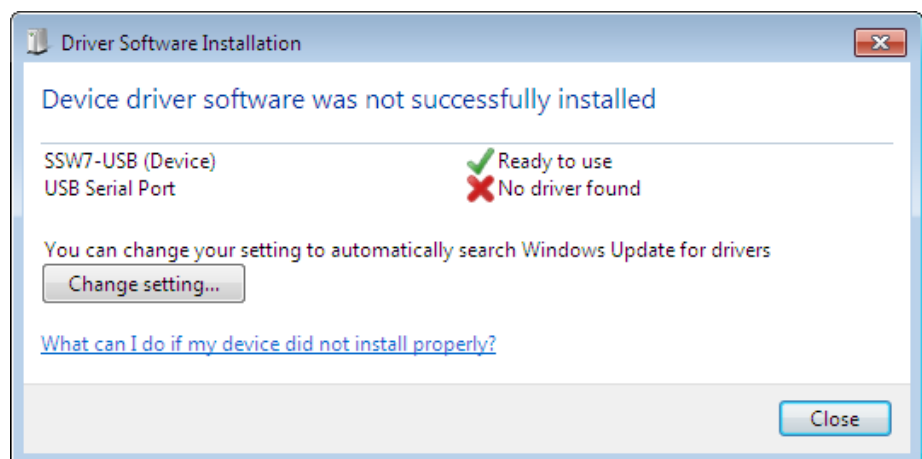
- A new COM port is now added in the device manager. This must be selected as the type of access for all further applications.



If several USB interfaces are available, but the SSW7-Teleservice-Modem CD is not at hand, we recommend copying the driver files onto the local hard disk because it is possible that a separate instance of the driver for the SSW7-USB has to be installed on the PC for each USB interface.

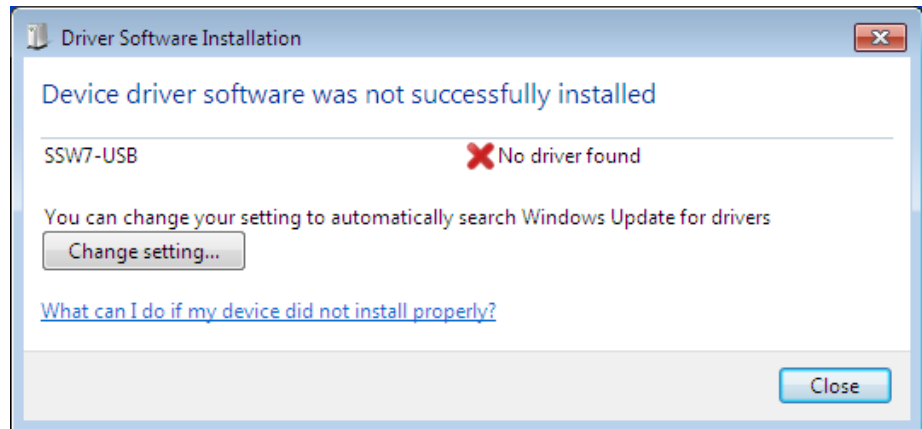
### 4.3 Installing the USB driver in Windows 7

Two driver instances have to be installed on the PG/PC even for the Windows 7 operating system. If a SSW7-USB is connected via USB for the first time the operating system searches for a compatible driver. In many cases it is possible that a driver will be found automatically. The corresponding message could appear as follows:



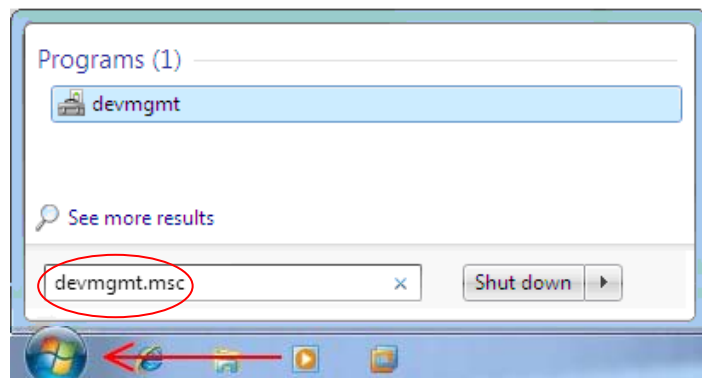


If no information is available to the operating system, the following message usually appears:

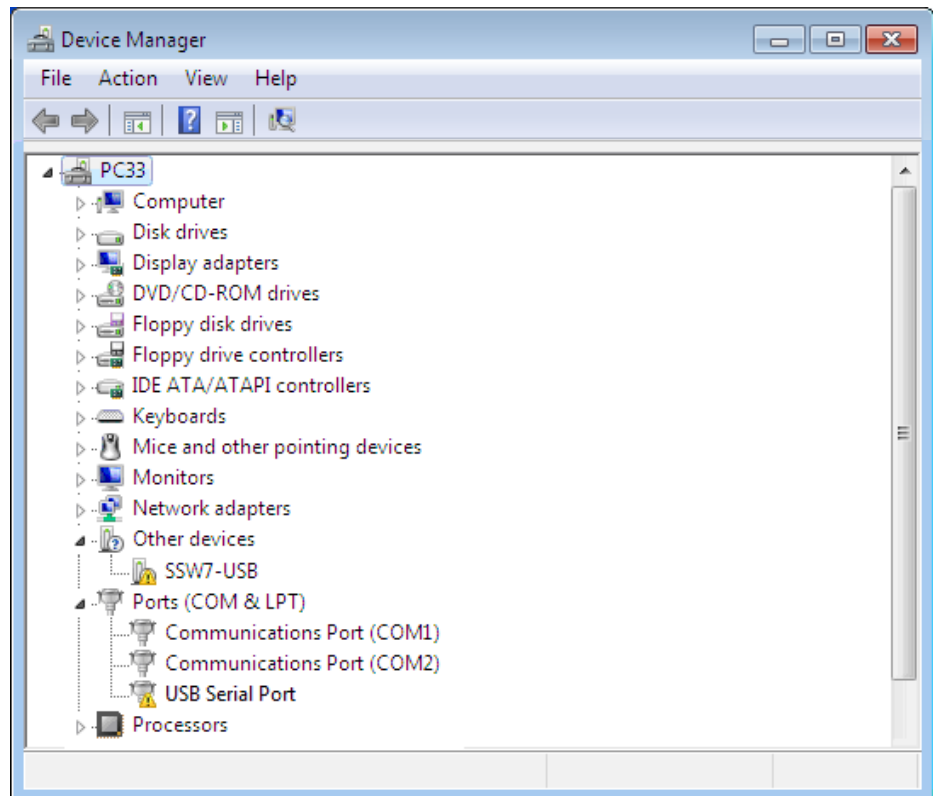


These advices may in each case be cancelled with "Close". However, Windows 7 does not start an automatic installation routine as a result.

- In the first step the operator's "Device Manager" has to be opened manually. For example, a possible call via the "devmgmt.msc" command in the start menu's search bar would be:



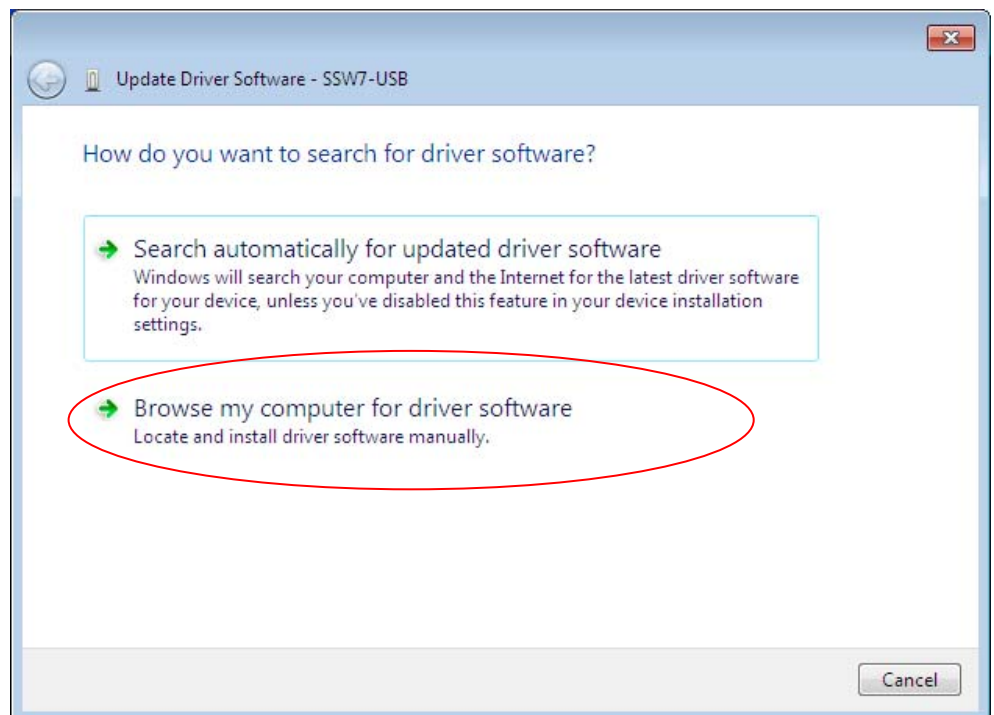
- All unrecognised/uninstalled devices (identified by an exclamation point in a yellow triangle) are currently listed here.



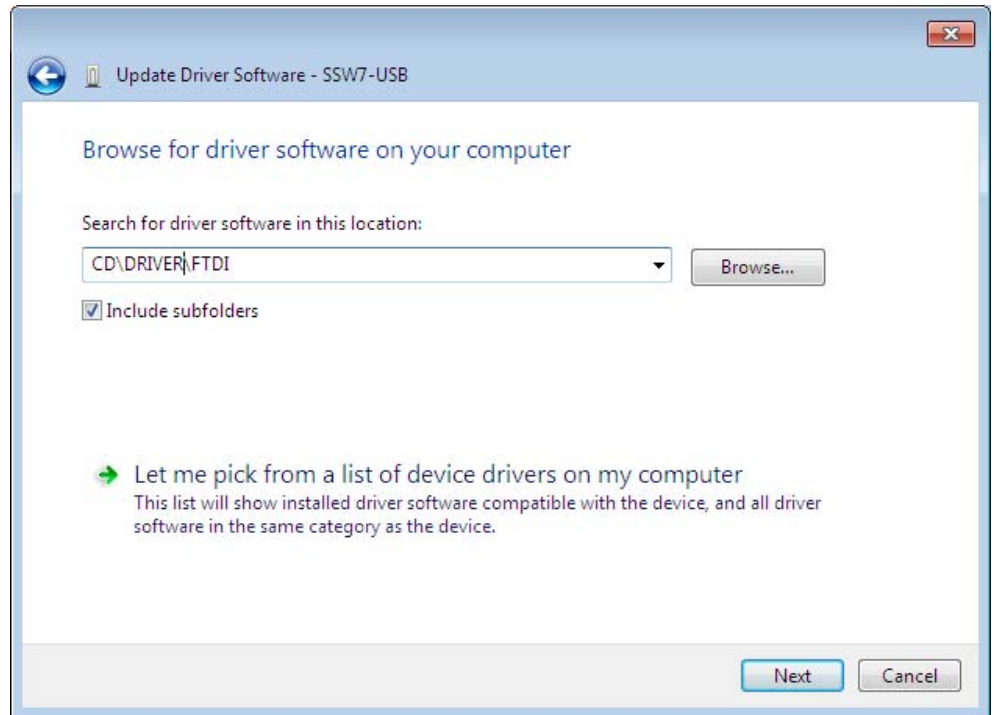
- With a right click on "SSW7-USB" a selection list appears in which the "Update driver software..." function has to be selected.
- Driver software must be searched for on the computer.



The following steps resemble the Windows XP routine.

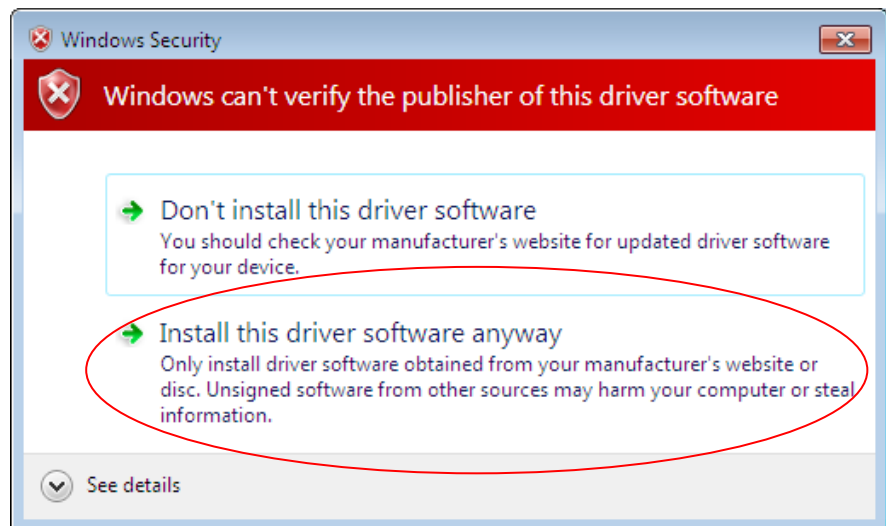


- A prompt follows for specifying the location of the driver. Here, employing the "Search..." button, point to the CD-ROM included in the delivery and then confirm with "Next".

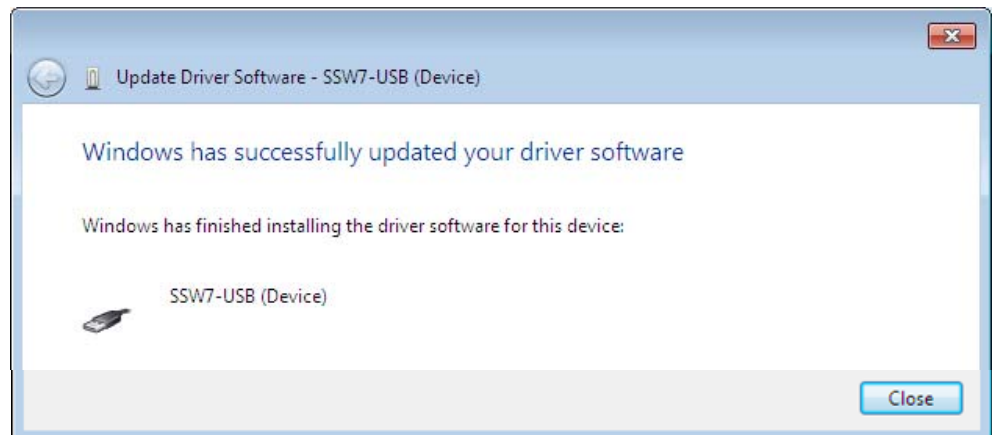


If the SSW7 Teleservice Modem CD is inserted in a local drive, the search for a driver is performed at this stage.

If the corresponding driver files are found, the Windows 7 confirmation prompt appears:

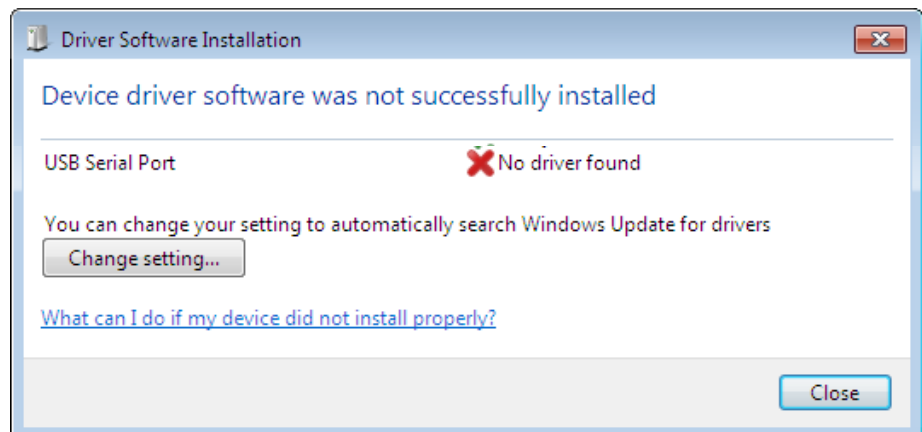


- Confirm that this driver software should still be installed. The files are then saved in the corresponding operating system directory.



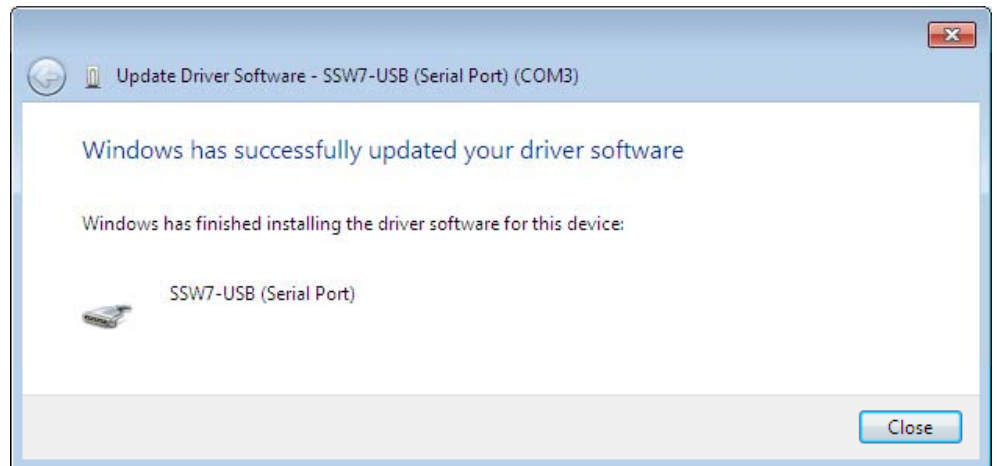
- Following a successful installation the process is terminated by activating the "Close" button.

The operating system should recognise automatically as a result that a second driver instance has to be installed. If this advice appears, it is once again cancelled with "Close".



- Open the "Device Manager" again so that the routine described above can be carried through in this way a second time. The process is identical to the one previously described.

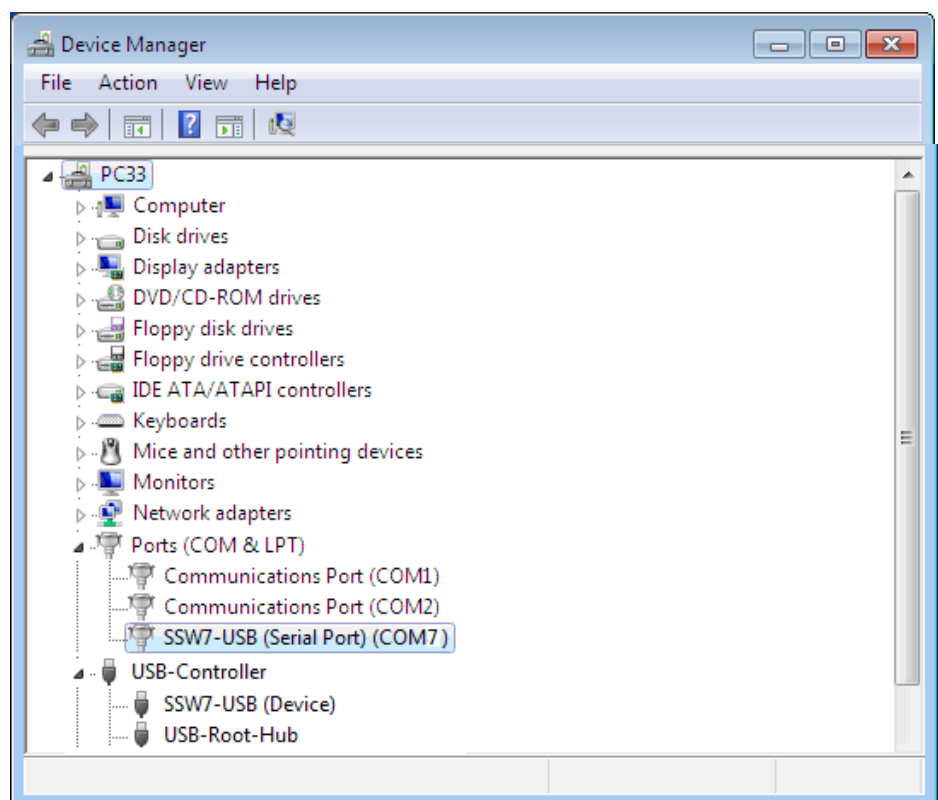
- If at this stage the virtual COM port driver has also been successfully installed, this message should be displayed:



- Once activating the "Close" button the USB device installation process in Windows 7 is completed.
- A SSW7-USB (device) has now been listed among the USB Controllers in the Device Manager. A new COM port has also been added. It must be selected as the access path for all other applications.



*If at one point you should plug the SSW7-USB into another USB interface the possibility exists that another COM interface may be assigned to the SSW7-USB.*



When using the SSW7-USB with Siemens Engineering Software care has to be taken that no virtual COM port higher than 8 is listed. If this occurs, however, the port number assignment can be changed in the COM port's advanced settings.

## 4.4 Updating and diagnosing with SHTools

The SSW7-USB operating system can be updated with SHTools software as needed. SHTools also provides tools for applying additional functions.

The tool is freeware and has been tested in Windows 2000, XP, Vista and Windows 7. It is available on the CD included in the delivery.

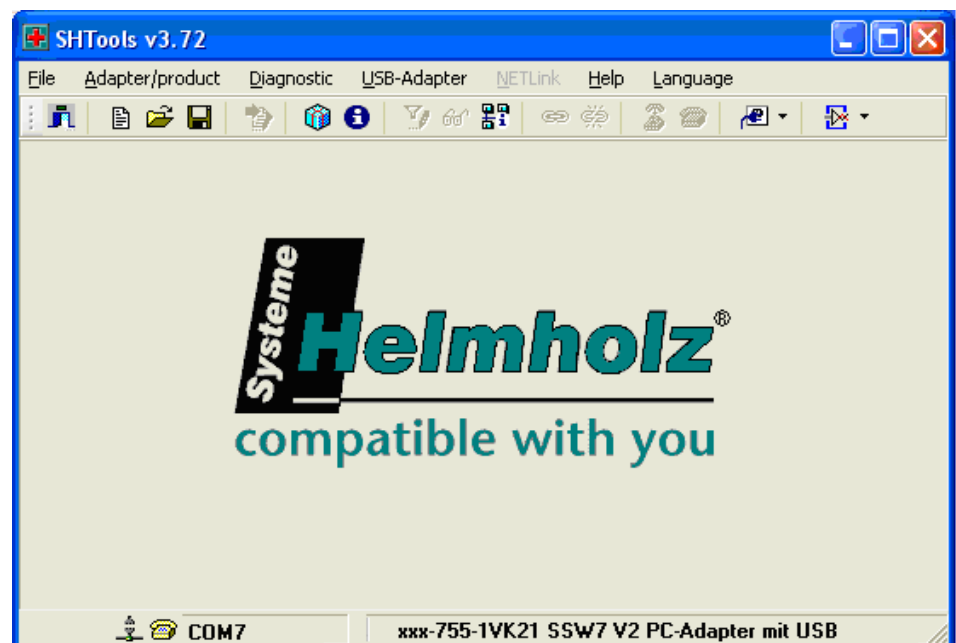
The most current version can always be downloaded from the Internet at <http://www.helmholz.de> as well.

Once installed SHTools is available in the start menu under *"Start/Programs/Systeme Helmholtz"*.

The most important functions for the SSW7-USB are described in the following.

### 4.4.1 Firmware update

To update the SSW7-USB operating system a connection has to be made between the SSW7-USB and a USB interface on the PG/PC on which SHTools is installed.



*The selection is displayed in the status bar at the lower edge of the application window.*

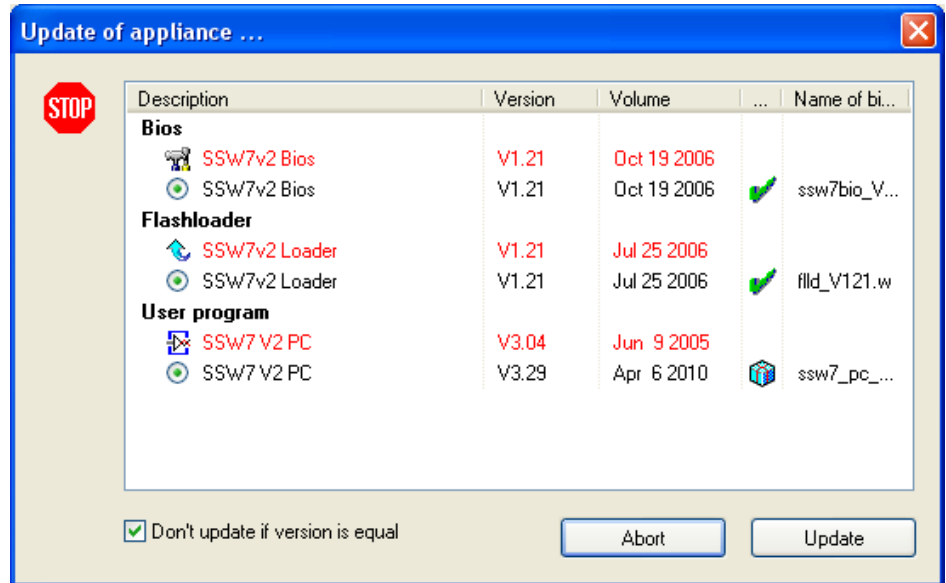
Because SHTools supports the update functions for many Systeme Helmholtz GmbH products, the adapter family has to be selected manually.

- Using the *"Adapter / ...select"* menu item the appropriate device (here SSW7 V2 PC adapter with USB) is selected by reference to the order number.
- The interface specified by the USB driver is set using the *"Adapter / select com port/serial number"* menu item.

- A connection to the SSW7-USB is established once the "*Adapter / Update adapter*" menu item is activated. If this is successful, the firmware parts, of which newer versions are available, automatically begin to update.

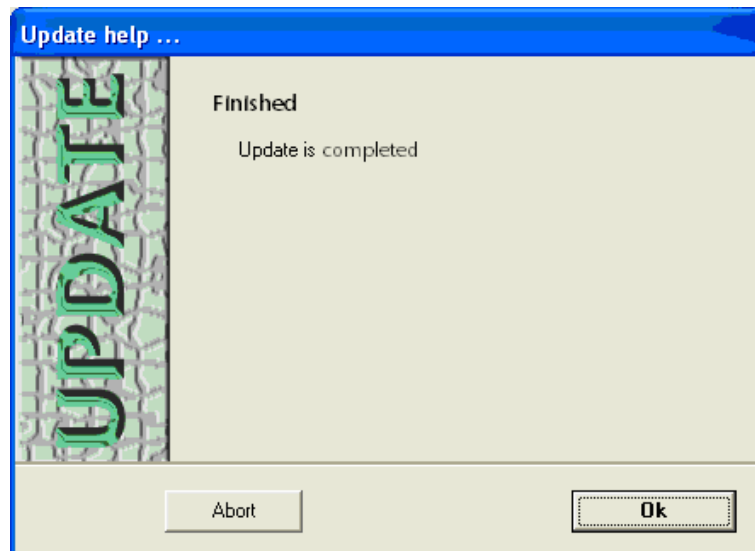
The "*Automatical Update*" option can be selected under "*File / Settings*" prior to the update. In that case, no further additional inputs are required of the user during the update and the whole procedure is quicker as a result.

- The update process is started by activating the "*Update*" button.

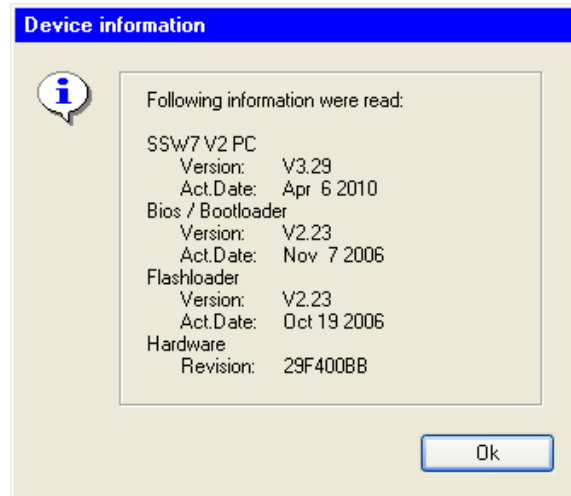


Transferring the new firmware can take several minutes and must not be interrupted!

- "*Finished*" indicates that the update has been successfully implemented.



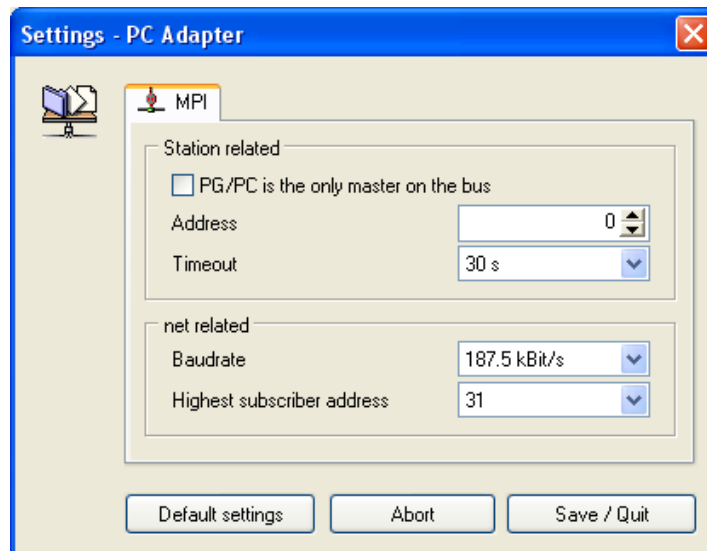
- If the update has been successfully implemented, the current version of the firmware installed can be read via the "Adapter / get adapter information" menu item.



#### 4.4.2 Diagnosis with SHTools

With SHTools a quick and easy device communication test can be conducted via an automation system. For this the SSW7-USB has to be connected to the MPI interface of a CPU.

- The MPI bus parameters have to be checked via the "Adapter / change adapter settings" menu item and adjusted if necessary. The standard parameters (identical to Siemens Engineering Tools) are seen in the following figure:



! Here, the adjustments made cannot be saved in the SSW7-USB.

! In case of different network settings the CPU cannot be accessed!

The specifications for

- Baudrate and
- Highest subscriber address

must agree with the hardware configuration of the CPU connected. In addition, care has to be taken that a MPI address not yet used in the network connected is assigned to the SSW7-USB. In the majority of cases the default settings indicated can be left as is. Any of the station and network related parameters

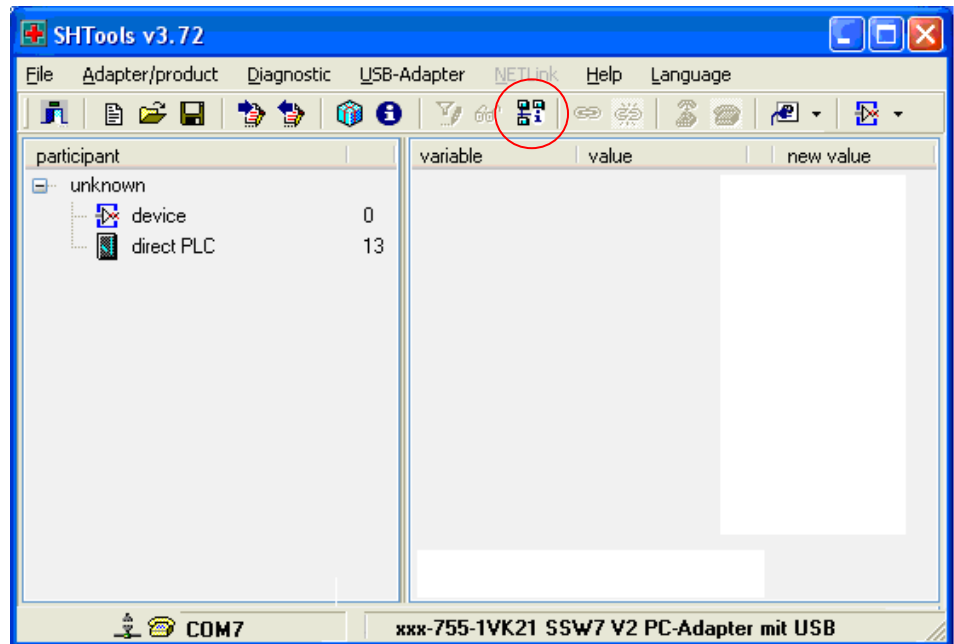


shown here are displayed by activating the "Default Setting" button.

After having left the settings via "Quit", an information request of the bus peers connected can be conducted employing the "available participants" function.



*A read and write function of variable values from the automation device is not installed for the SSW7-USB.*

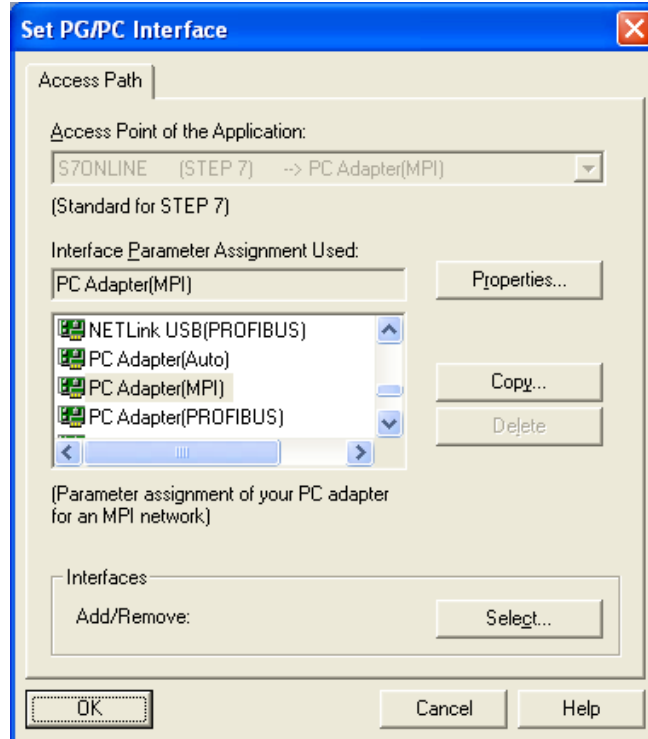


In the example shown here, the CPU is recognised by the MPI address 13. Here, device 0 is the SSW7-USB itself.

## 5 Configuration of the Simatic tools

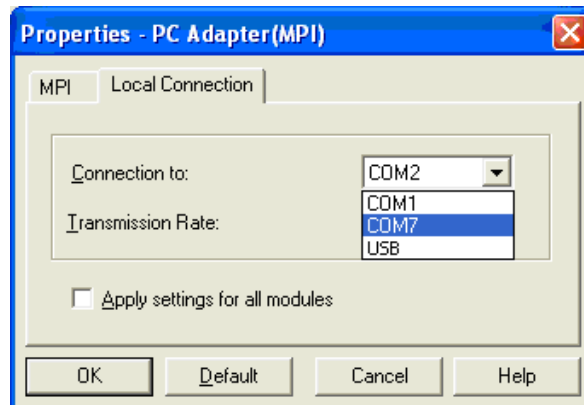
In the PG/PC interface configuration, the Simatic-specific PC adapter can always be used in the automatic mode (Auto) or with manually assigned bus parameters via (MPI).

**!**  
The SSW7-USB settings are always made in the application software and automatically sent to the adapter with which communication with the automation device is conducted. No parameters are stored in the device. This programming software can also serve to program an operation terminal, for example, or a visualisation.



The previously installed virtual COM port must be set in the PC adapter settings "Properties" prior to first use (see Chapter 4).

**!**  
The virtual COM port number must be enabled in the connection field at all times. If a menu item is listed with nothing but "USB", it must not be used!



Transfer rate adjustments are not necessary because the SSW7-USB driver ignores the baud rate set.

Once the bus-specific parameters have been adjusted (see Chapter 4.4.2), the application connected can be accessed as usual.

## 6 Troubleshooting

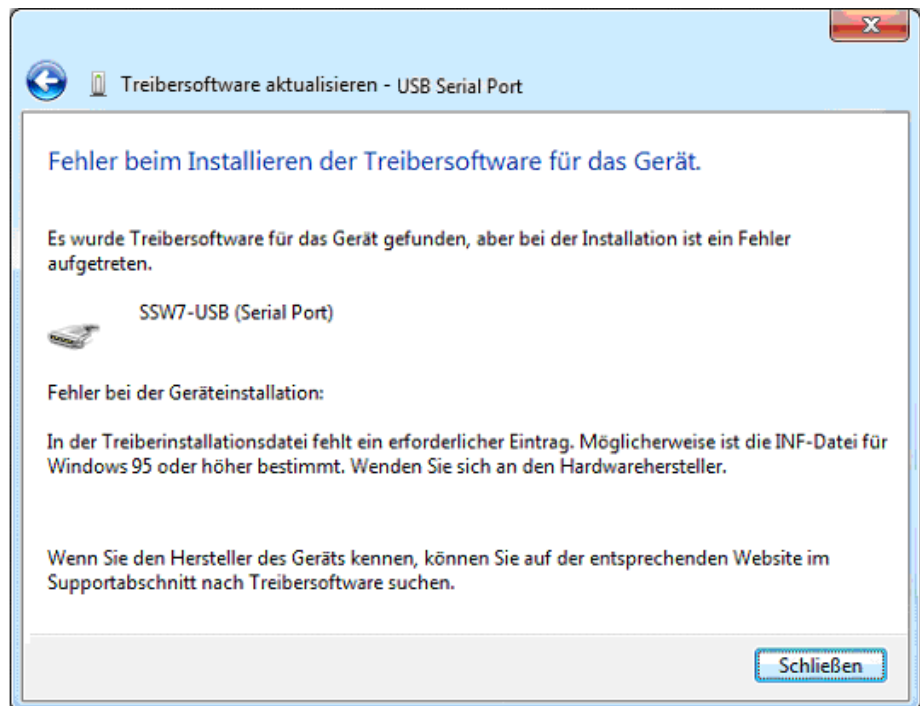
The points described here show some typical errors that can occur in day-to-day work with the SSW7-USB.

If any condition during operation is not described here and this manual does not provide any information on how to remedy it, the support of Systeme Helmholtz GmbH is available to help you.

**Q:** I have installed the USB driver for the SSW7-USB to use directly on my PC. COM port “9” that I selected is displayed on the programming device/PC interface. Unfortunately Step7 does not work with the SSW7-USB.

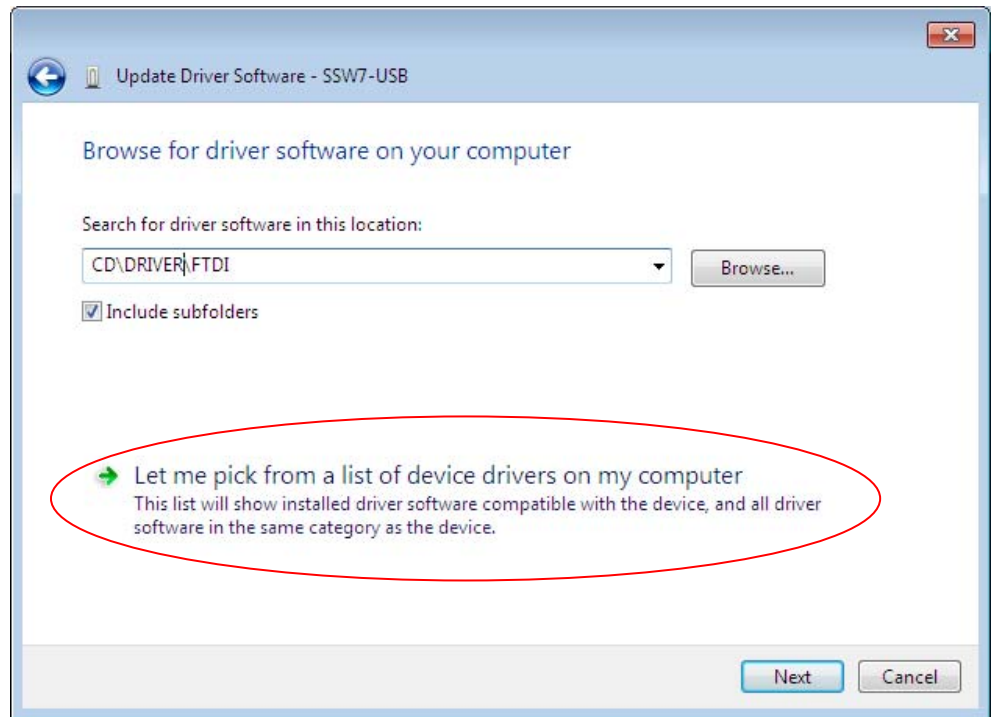
**A:** The programming device/PC interface displays all available COM ports but only works reliably with the first eight. Please set the COM port you are using manually to a COM port less than or equal to “8” in the device manager to ensure the function works.

**Q:** During driver installation in Windows 7 the following message appears:

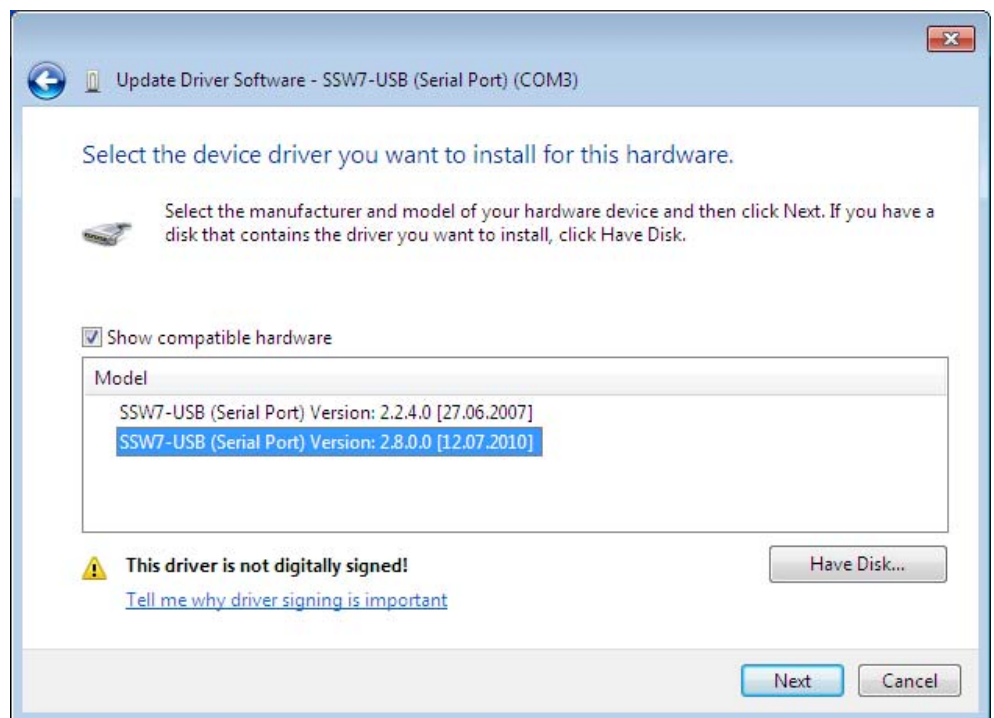


**A:** The operating system may have found older driver instances during the installation routine, which are no longer compatible with the USB device.

In this case the list of device drivers has to be referred to during the installation.

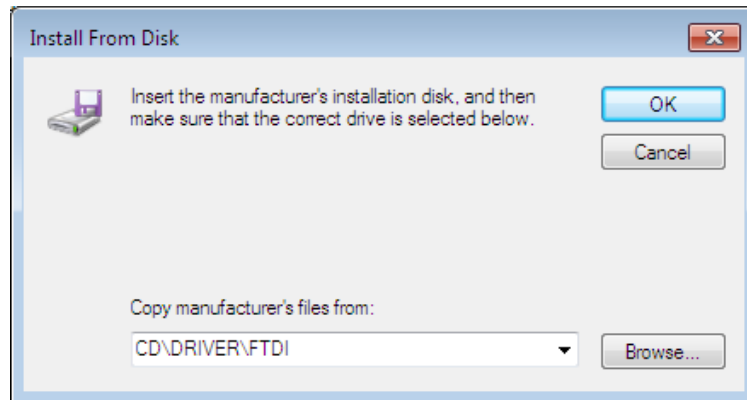


Then the version desired must be specifically selected in the ensuing drop-down menu and confirmed with "Next".

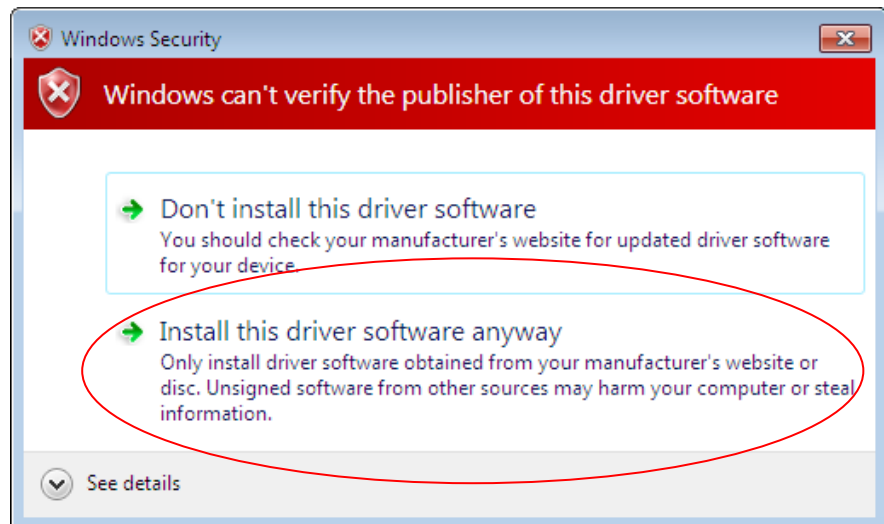


If the version desired is not displayed when going to select, then the "... data medium" driver files have to be referred to once again.

Insert the SSW7 Teleservice Modem CD in the PG/PC drive and confirm with "OK".



If the corresponding driver files are found, the Windows 7 confirmation prompt appears:



Confirm that this driver software should still be installed. After that the correct files should be loaded into the operating system.

**Q:** What must I observe when calling your technical support?

**A:** Please have all relevant data of your system constellation with the connected stations and program modules at hand when you contact technical support at Systeme Helmholtz GmbH.

## 7 Appendix

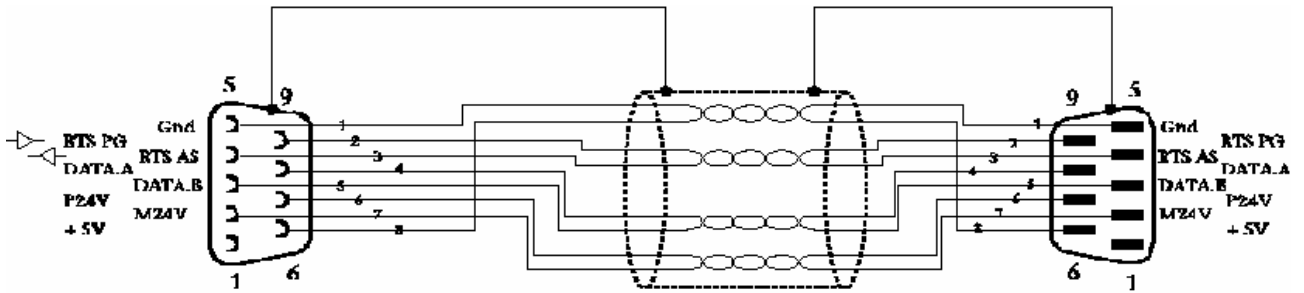
### 7.1 Technical Data

Device type	700-755-1VK21
Degree of protection	IP 20
Dimensions	105 x 53 x 29 mm (LxWxH)
Weight t	Approx. 180g (incl. MPI cable & connector)
Operating voltage	DC +5V, from the USB bus
Current consumption	Approx. 150 mA (max.)
Temperature during operation	0 °C to +60 °C
Temperature during storage/transportation	-20 °C to +60 °C
Relative humidity during operation	5 % to 85 % at 30 °C (no condensation)
Relative humidity during storage	5 % to 93 % at 40 °C (no condensation)
Quality assurance	according to ISO 9001:2008
Maintenance	Maintenance free (no battery)
<b>MPI - Bus</b>	
Interface	9-way SubD-socket / RS485
Connecting cable	1,2m flexible control cable with copper braided shield
Transmission rates	19.2 kBit/s or 187,5 kBit/s
<b>USB</b>	
Interface	Type B-socket / USB 1.1 compliant
Transmission rate	9.6 kBit/s to 115.2 kBit/s through virtual COM-port
<b>Electromagnetic compatibility (EMC)</b>	
Interference emission	Class B to EN55022
Interf. immunity on signal lines	±2kV acc. EN61000-4-4
Noise immunity ESD	±6kV contact discharge EN61000-4-2 ±8kV air discharge EN61000-4-2
RF-radiation fields	10V/m acc. EN61000-4-3
Conducted RF interference	10V acc. EN61000-4-6

### 7.2 MPI interface pin assignment

Connector	Signal	Meaning
1	-	unused
2	-	unused
3	RxD- / TxD-P	receive / transmit data-P
4	RTS_AS	CPU transmit ID
5	DGND	Ground for bus termination (looped through)
6	DVCC	5 V DC for bus termination (looped through)
7	-	unused
8	RxD / TxD-N	receive / transmit data-N
9	RTS_PG	Programming device transmit ID

Wiring diagram of a MPI extension cable (available as accessories):



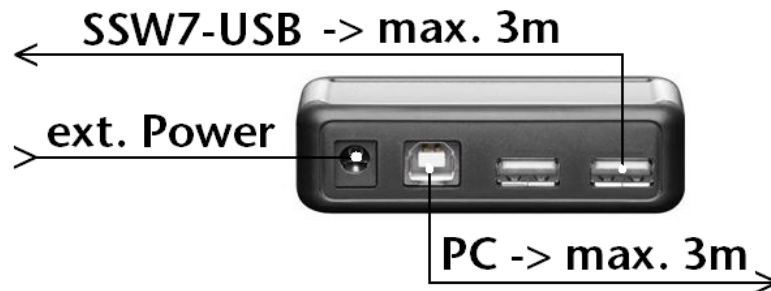
### 7.2.1 Assignment of the USB interface



USB A	Signal	Meaning
1	VCC	DC +5 V
2	D-	Data signal -
3	D+	Data signal +
4	GND	Ground

The SSW7-USB comes with a shielded USB 2.0 cable with a length of three meters. The cable has a standard A and a standard B connector.

Where distances of more than three meters have to be covered, we recommend using USB hubs with an external power supply.



### 7.3 Further Documentation

Internet:

<http://www.helmholz.com>

<http://www.siemens.com>

<http://www.usb.org>