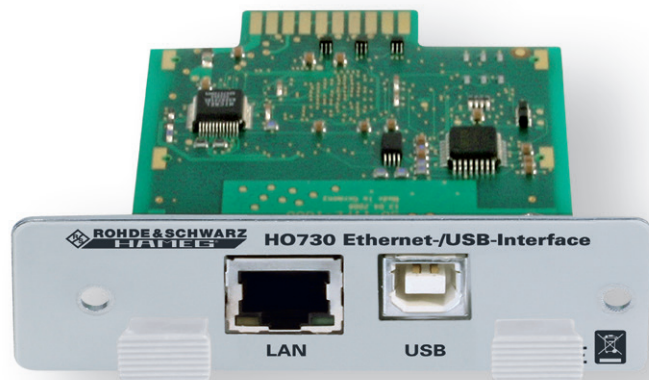
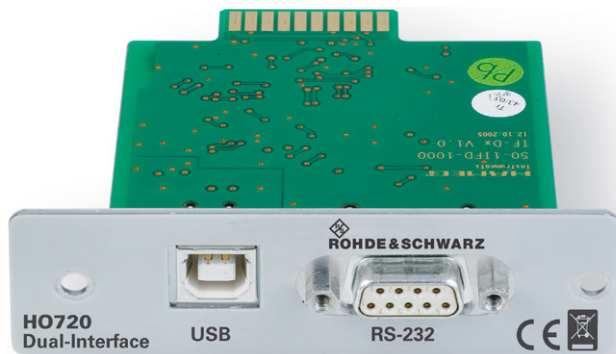


R&S®H0720 / R&S®H0730

Dual Interface

Installation Guide



5800551002

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1 General Information

1.1 Safety hints

Attention!

Fitting or exchanging of an interface must not be made unless the instrument is switched off and not connected to line (mains).

During operation the interface opening must be closed.

All interface connections are galvanically connected to the instrument.

Measurement at high potentials is prohibited and endangers the instrument, the interface and all equipment connected to the interface.

If the safety rules are disregarded, any damage to we will not take any responsibility for damage to people or equipment of other make.

1.2 Interface Description

The R&S®HO720 resp. R&S®HO730 is a dual Interface that can be used alternatively as a USB 2.0 or as a RS-232 resp. Ethernet interface in connection with the HAMEG CombiScopes HM1008(-2), HM1508(-2), HM2008, the Mixed Signal Oscilloscopes of the R&S®HMO series, the Arbitrary Function Generators of the R&S®HMF series, the Power Supplies of the R&S®HMP series, as well as the HAMEG spectrum analyzer HM5530 and the R&S®HMS(-X) series for data transfer and remote control. Only one function (USB or RS-232 / Ethernet) – not both at the same time – can be activated. It is also possible to establish a physical USB connection and to control the instrument via a virtual COM port. Both interfaces enable serial data transfer.

1.2.1 USB

The interface R&S®HO720 / R&S®HO730 is equipped with a type B USB connector. For direct connection with a host controller or an indirect connection via a USB hub, a USB cable equipped with type B connector at one end and type A male connector at the other end is required.

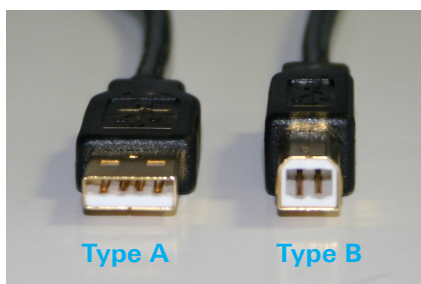


Fig. 1.1:
USB type A and
type B

1.2.2 RS-232

The R&S®HO720 RS-232 interface is built with a 9-pin D-SUB connector. This bidirectional interface allows the transfer of setup parameters, data and screenshots from an external device (e.g. PC) to the power supply or vice versa. It is possible to establish a direct connection from the PC (serial port) to the interface via 9-pin shielded cable (1:1 wired). The maximum length must not exceed 3 m. The pin assignment for the RS-232 interface (9-pin D-SUB connector) is specified as follows:

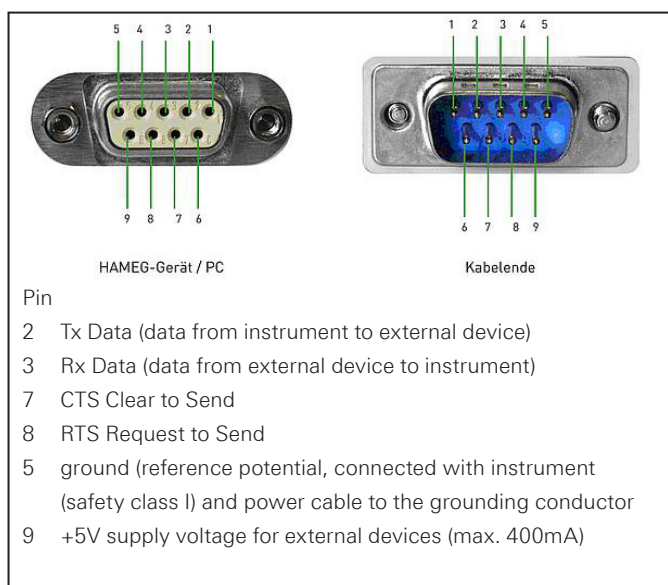


Fig. 6.1: Pin assignment of the RS-232 interface

The maximum voltage variation at the Tx, Rx, RTS and CTS connections is ± 12 Volt.

The RS-232 standard parameters for the interface are listed in the respective instrument user manual

1.2.3 Ethernet

The interface card R&S®HO730 is equipped with an Ethernet type RJ-45 connector according to IEEE standard 802.3. For the direct connection with a host (PC) or indirect connection over a SWITCH, a doubly protected network cable (e.g. CAT.5, CAT.5e, CAT.5+, CAT.6 or CAT.7) is required, equipped with an Ethernet plug type the RJ-45 at each end. Either an uncrossed or a crossed network cable (cross over cable) can be used.

1.3 Firmware CombiScope

It is absolutely necessary to check the oscilloscope firmware version before fitting the interface R&S®HO720/ R&S®HO730. The firmware version already on the scope is displayed after switching on if "Quick Start" is off. The "Quick Start" function can be changed after pressing the SETTINGS pushbutton and calling "Misc.".

If the firmware version is 03.000-yy.yyy or higher, continue the R&S®HO720 / R&S®HO730 interface fitting. In the case of firmware versions below 03.000-yy.yyy, R&S®HO720 resp. R&S®HO730 will not be recognised and a firmware update is required.

In case of a firmware version below 03.000-yy.yyy, please download the current firmware from www.hameg.com and update the oscilloscope. After receiving the current firmware and its installation instruction, the firmware installation must be done via the RS-232 interface HO710. If the current firmware is installed, future updates can be also made with R&S®HO720 / R&S®HO730.

1.4 Firmware for other instruments

With the other instruments (R&S®HMO, R&S®HMS(-X), R&S®HMP, R&S®HMF series and HM5530) the interface will be recognized by the firmware.

Please refer to the instrument user manual for detailed information about activating the desired interface (USB / RS-232 / Ethernet) and setting interface parameters.

2 Fitting Instruction

The following fitting instruction shows a CombiScope, but the interface fitting is also the same for the other compatible instruments.

Safety!

The following procedures must only be carried out on condition that the mains (line) power cable is not connected to the oscilloscope and no connection is made at the measurement inputs.

Attention!

To avoid damage of the interface during removing and fitting by electrostatic discharge, please link a metal part of the oscilloscope to equalise potentials between oscilloscope and your body. Maintain this connection during the fitting/removing!

Only touch the interface at its mounting panel.

Remove the fastening screws.



Fig. 2.1: Remove fastening screws

Pull out the interface via mounting panel or connected interface cable.



Fig. 2.2: Removing the interface card

Insert the interface card into the interface card slot that the PCB will be inserted in the guide bars – visible on both sides – and push it in completely.



Fig. 2.3: Fitting the interface card

Fit the interface with the fastening screws previously removed.



Fig. 2.4: Fastening screws

3 USB Driver Installation

The following requirement for R&S®H0720 / R&S®H0730 USB driver installation are necessary:

- 1 An instrument with an activated USB interface.
- 2 A PC with operating system Windows XP™, VISTA™, Windows 7™, Windows 8™ or Windows 10™ (32 or 64Bit).
- 3 Administrator rights are necessary for the installation of the driver. If an error message regarding spelling errors appears, the rights to install the driver are not given. In this case, please contact your IT department to obtain the necessary rights.

The actual USB driver can be downloaded from the Rohde & Schwarz homepage for free. The R&S®H0720 / R&S®H0730 USB driver ZIP file includes a native USB and virtual COM port driver

If a connection between PC and the instrument has been established and no USB-VCN driver is installed, the operating system answers with "Found New Hardware". In addition, the "Found New Hardware Wizard" is displayed. Only in this case the USB driver must be installed.

3.1 Installation with Windows XP™

Please choose "No, not this time" and click "Next".

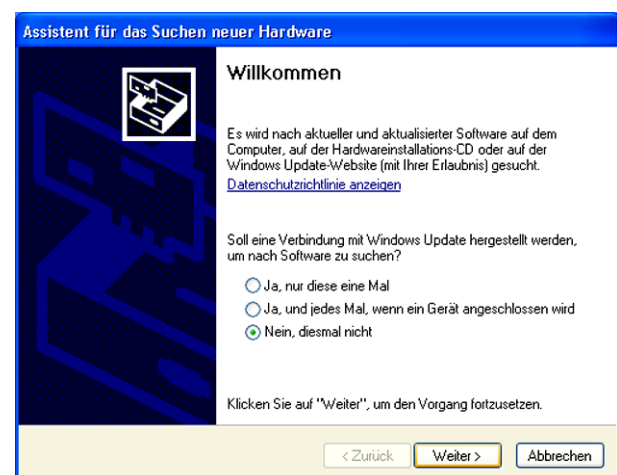


Fig. 3.1: Assistant for new hardware search

USB Driver Installation

Select “Install from a list or specific location (Advanced)” and click “Next”.

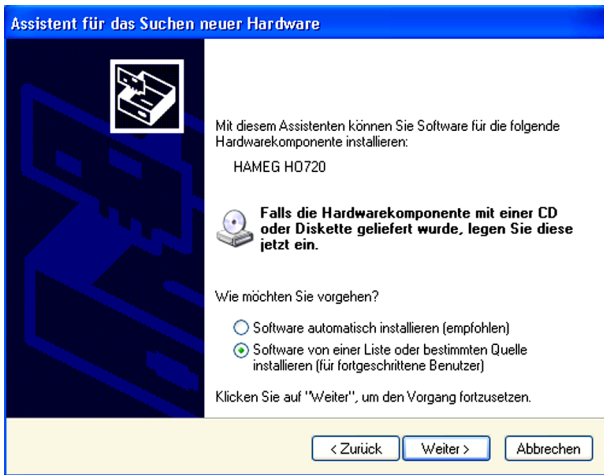


Fig. 3.2: Driver file assistant

„Browse” for the selected drive and select the folder containing the driver. Confirm with “OK”.



Fig. 3.3: File folder

After the selected path is displayed click “Next”.

The “Hardware Installation” window will be displayed, showing a warning to continue the installation procedure. In case of installation of the R&S®HO720 / R&S®HO730 driver, the warning is irrelevant. Click „Continue”.

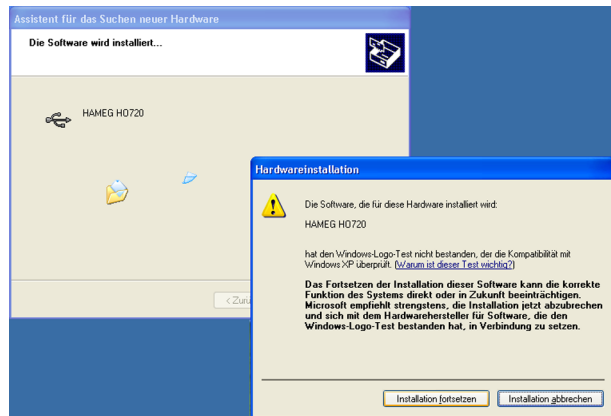


Fig. 3.4: Driver installation warning

The R&S®HO720 / R&S®HO730 USB driver will be installed.

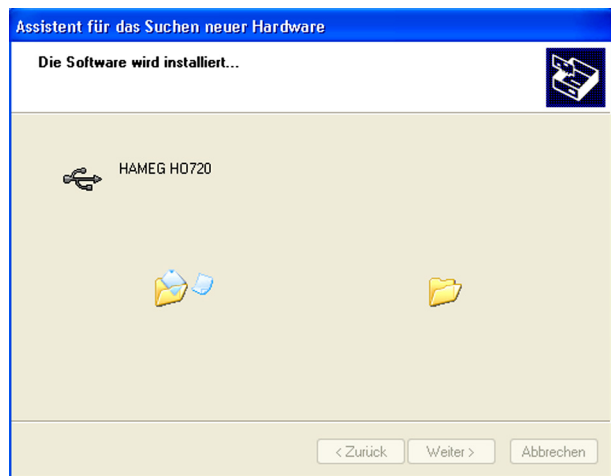


Fig. 3.5: Driver installation

Please click “Finish” to complete the installation.

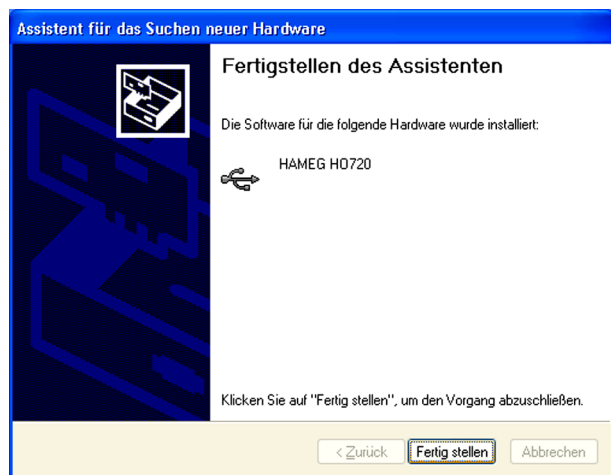


Fig. 3.6: Completion of the driver installation

To activate the virtual COM port (VCP) in order to communicate with a terminal program or external software environments (NI) please refer to chapter 4.

3.2 Installation with Windows 7™

If the window „New Hardware found“ appears, please click on „Skip downloading the driver with Windows Update“ (menu bar).

If the window is disappeared, you have to open the device manager. The instrument will be displayed with a yellow exclamation mark in the device manager of the PC. Choose the instrument and update the driver software via right click.

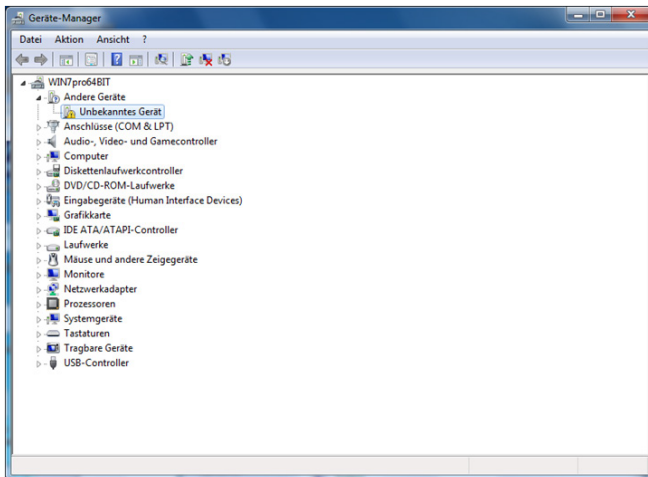


Fig. 3.7: Device manager

Choose „Browse my computer for driver software“.

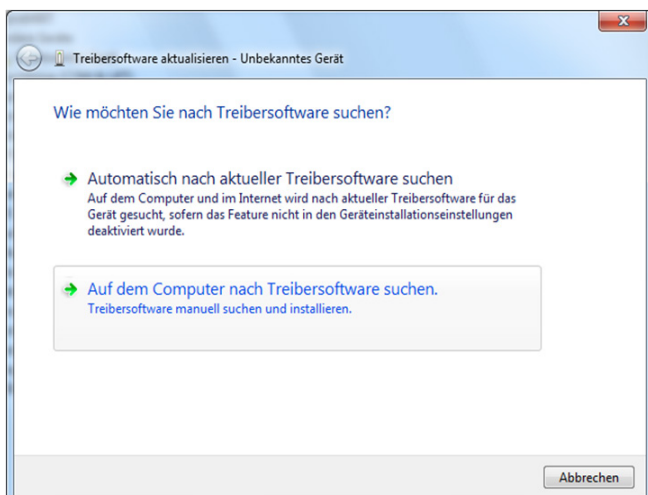


Fig. 3.8: Searching driver software

„Browse“ the appropriate folder where the driver was unzipped and saved. Afterwards, press „Next“.

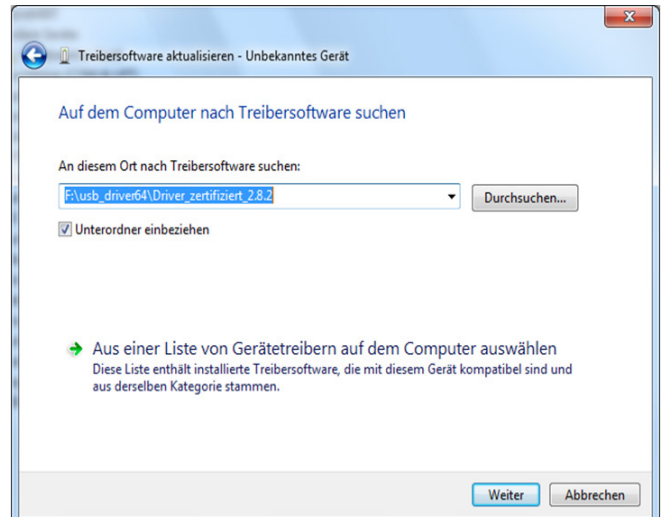


Fig. 3.9: Choosing driver folder

After successful installation of the R&S®HO720 / R&S®HO730 USB driver the instrument will be displayed as „Hameg Measurement Device“.

To activate the virtual COM port (VCP) in order to communicate with a terminal program or external software environments (NI) please refer to chapter 4.

3.3 Installation unter Windows 8™ / 10™

If the driver ZIP file is downloaded and saved, the driver file can be installed manually via the device explorer. The instrument will be displayed with a yellow exclamation mark in the device manager of the PC. Choose the instrument and update the driver software via right click.

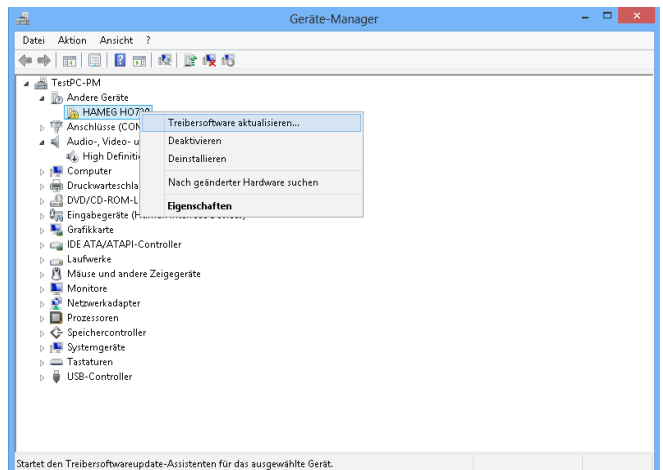


Fig. 3.10: Dveice manager

Choose „Browse my computer for driver software.“

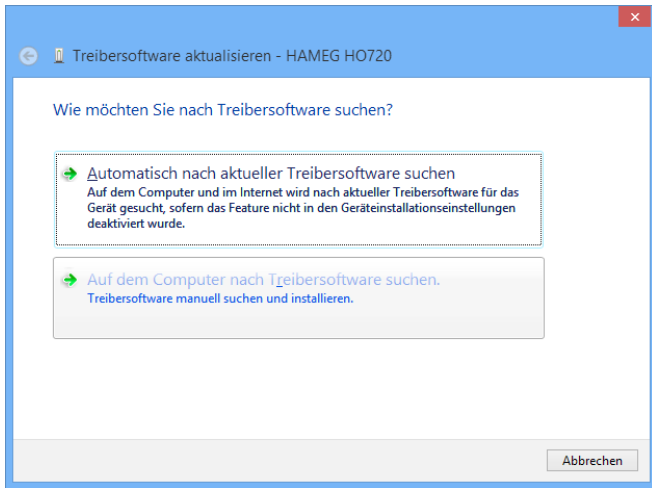


Fig. 3.11: Searching driver software

„Browse“ the appropriate folder where the driver was unzipped and saved. Afterwards, press „Next“.

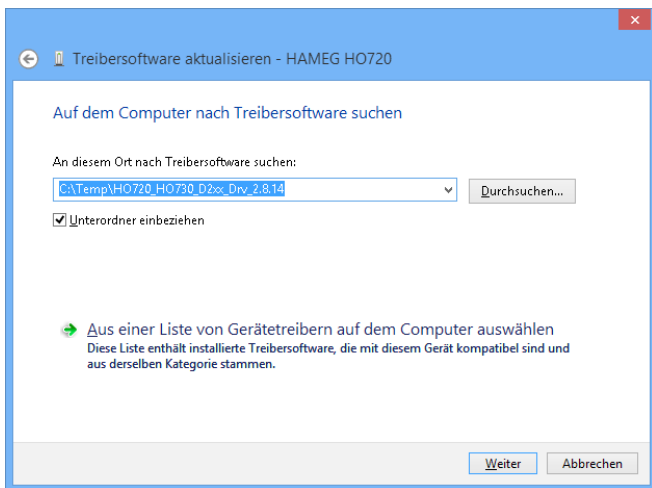


Fig. 3.12: Choosing driver folder

After successful installation of the USB driver the instrument will be displayed as „Hameg Measurement Device“.

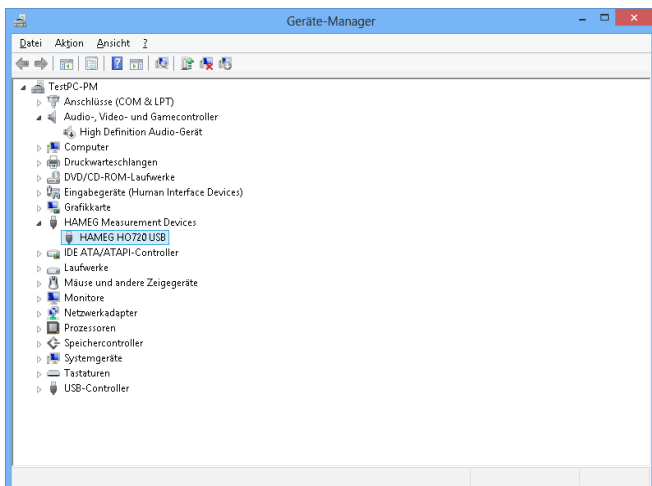


Fig. 3.13: Instrument display in the device manager

To activate the virtual COM port (VCP) in order to communicate with a terminal program or external software environments (NI) please refer to chapter 4.

4 Virtual COM port Installation (VCP)

If the native USB driver of the R&S®HO720 / R&S®HO730 interface is installed and the instrument will be displayed in the device manager, the virtual COM port driver (VCP) can be installed.

Via right click on „HO720“ resp. „HO730“ the interface properties of the USB interface can be opened.

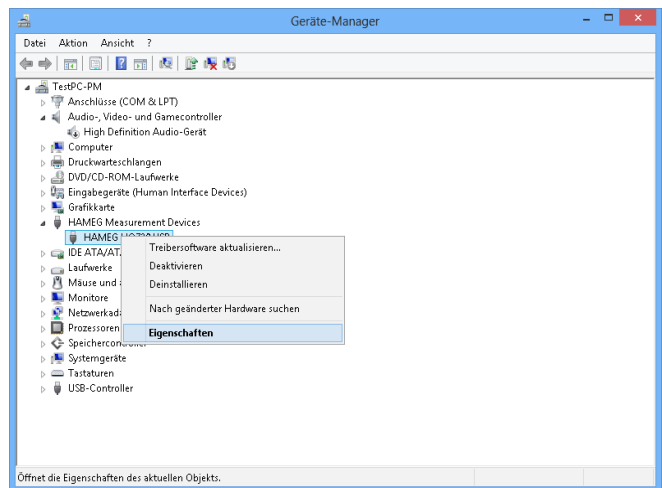


Fig. 4.1: Interface properties

Choose the tab „Advanced“ and activate the VCP (virtual COM port). Press „Ok“ to close the properties window.

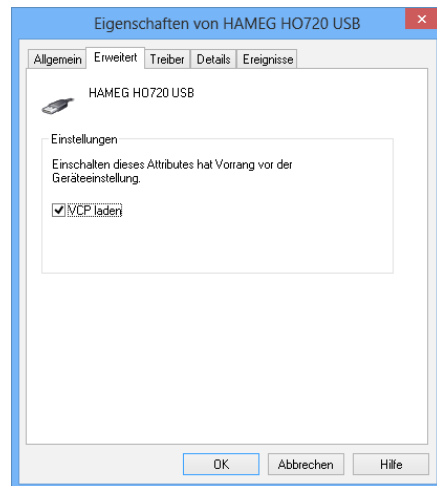


Fig. 4.2: VCP activation

After instrument restart or reconnection of the USB interface cable the instrument will be displayed in the device manager as COM port.

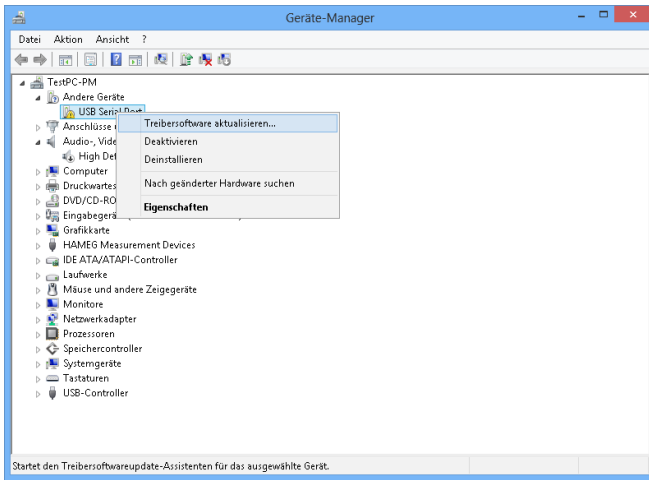


Fig. 4.3: Instrument display in the device manager as COM port

After the reconnection of the USB interface cable Windows will be started to search the VCP driver because the virtual COM port driver will be installed separately. Choose „Browse my computer for driver software“.

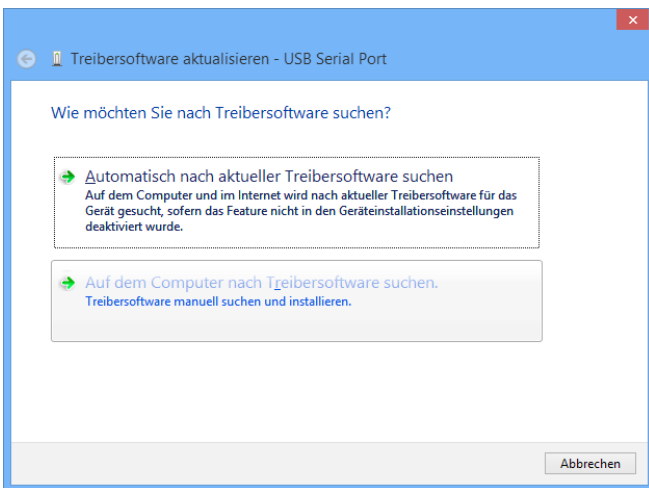


Fig. 4.4: Searching driver software

„Browse“ the appropriate folder where the driver was unzipped and saved. Afterwards, press „Next“.

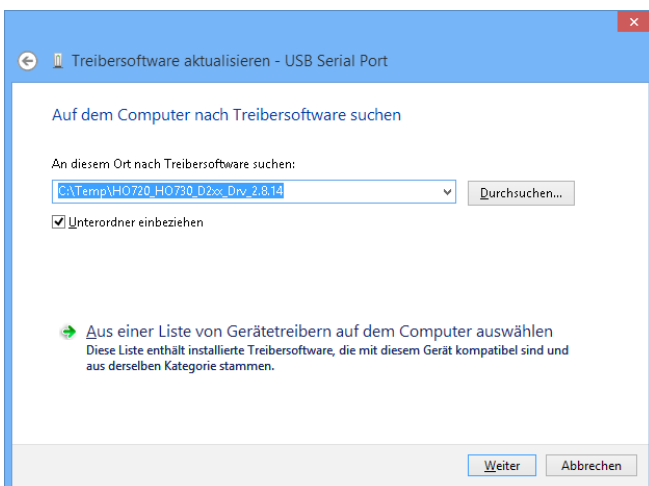


Fig. 4.5: Zuweisung des Treiber-Verzeichnisses

After successful installation of the R&S®HO720 / R&S®HO730 USB VCP driver the instrument will be displayed as „Ports (COM & LPT)“.

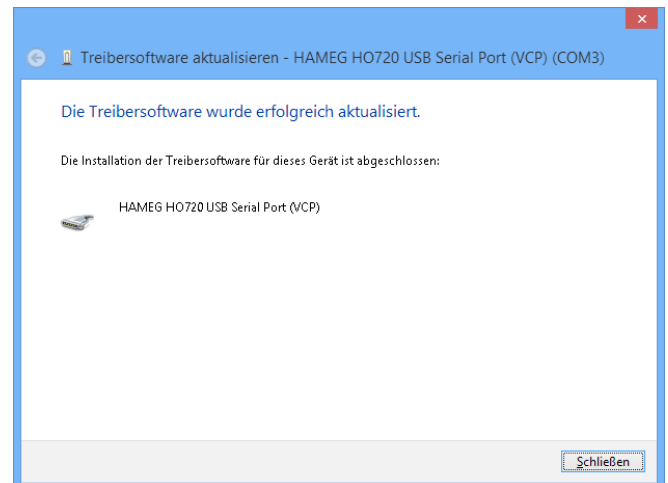


Fig. 4.6: VCP installed

Double click on the new installed COM port will open the „Properties“ window. Choose the tab „Port Settings“ to select the RS-232 settings for the virtual COM port (including hardware / software handshake).

Further settings may be selected via „Advanced“ tab, e.g. assignment of the virtual COM port from COM1 to COM 256.

5 Ethernet Configuration

The host (PC) must have an Ethernet LAN interface inserted. For the configuration of this interface you will find further information in its PC manual or in the manual of your network interface.

5.1 IP networks (IP – Internet protocol)

In order that two or several network elements (e.g. measuring instruments, host/PC's, ...) can communicate over a network with one another, some fundamental connections have to be considered, so that data communication is error free and unimpaired.

For each element in a network an IP address has to be assigned, so that they can exchange data among themselves. IP addresses are represented (with the IP version 4) as four decimal numbers separated by points (e.g. 192.168.15.1). Each decimal number is represented by a binary number of 8 bits. IP addresses are divided into public and private address ranges. Public IP addresses will be able to route by the Internet and an Internet service Provider (ISP) can to be made available. Public IP addresses can be reached directly over the Internet to directly exchange internet data. Private IP addresses are not routed by the Internet and are reserved for private networks. Network elements with private IP addresses cannot be reached directly over the Internet so no data can be directly exchanged over the Internet. To allow network elements with a private IP address to exchange data over the Internet, they require a router for IP address conversion (English NAT; Network address translation), before connection to the Internet. The attached elements can then data exchange over this router, which possesses a private IP address (LAN IP address) and also a public IP address (WAN IP address), via the Internet.

If network elements exchange data only over a local network (without connection with the Internet), appropriate

use private IP addresses. Select in addition e.g. a private IP address for the instrument and a private IP address for the host (PC), with which you would like to control the instrument. If you might connect your private network with the Internet later via a router, the private IP addresses used in your local network can be maintained. Since within each IP address range the first IP address is used as network IP address and the last IP address is used as Broadcast IP address, in each case two IP addresses have to be taken off from the "number of possible host addresses" (see table 1: Private IP address ranges).

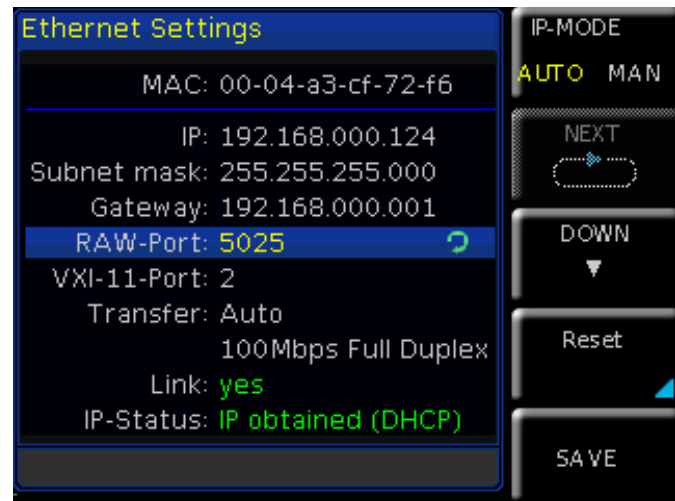


Fig. 5.1: Ethernet settings example

Apart from the organization of IP addresses into public and private address ranges, IP addresses are also divided into classes (Class: A, B, C, D, E). Within the classes A, B, and C are also include the private IP of address ranges described before. The categorisation from IP addresses is for the assignment of public IP address ranges of importance and essentially depends on the size of a local network (maximum number of hosts in the network), which is to be connected with the Internet (see table 2: Classes of IP addresses). IP addresses can fix (statically) or variable (dynamically) to be assigned. If IP addresses in a network are assigned fix, an IP address must be preset manually with each network element. If IP addresses in a network are assigned to the attached network elements automati

Adress range	Subnet mask	CIDR way of writing	Number of possible host addresses
10.0.0.0 – 10.255.255.255	255.0.0.0	10.0.0.0/8	$2^{24} - 2 = 16.777.214$
172.16.0.0 – 172.31.255.255	255.240.0.0	172.16.0.0/12	$2^{20} - 2 = 1.048.574$
192.168.0.0 – 192.168.255.255	255.255.0.0 255.255.255.0	192.168.0.0/16 192.168.0.0/24	$2^{16} - 2 = 65.534$ $2^8 - 2 = 254$

Tab. 5.1: Private IP adress ranges

Class	Adress range	Net quota	Host quota	Max. number of networks	Max. number of hosts
A	0.0.0.1 - 127.255.255.255	8 Bit	24 Bit	126	16.777.214
B	128.0.0.1 - 191.255.255.255	16 Bit	16 Bit	16.384	65.534
C	192.0.0.1 - 223.255.255.255	24 Bit	8 Bit	2.097.151	254
D	224.0.0.1 - 239.255.255.255			Reserved for multicast applications	
E	240.0.0.1 - 255.255.255.255			Reserved for special applications	

Tab. 5.2: Classes of IP addresses

cally (dynamically), a DHCP server (English DHCP becomes; Dynamic Host Configuration Protocol) is required for the dispatching of IP addresses. With a DHCP server an IP address range for the automatic dispatching of IP addresses can be preset. A DHCP server is usually already integrated in a router (DSL router, ISDN router, Modem router, WLAN router, ...) integrated. If a network element (e.g. an instrument) is connected by a network cable directly with a host (PC), the IP addresses cannot be assigned to the instrument and the host (PC) automatically, since no network with DHCP server is present here. They have to be preset therefore at the instrument and at the host (PC) manually.

IP addresses are divided by using subnet mask into a network quota and into a host quota, so similarly e.g. a telephone number is divided in pre selection (land and local area network number) and call number (user number). Subnet mask have the same form as IP addresses. They are represented with four decimal numbers separated by points (e.g. 255.255.255.0). As is the case for the IP addresses here each decimal number represents a binary number of 8 bits. The separation between network quota and host quota is determined by the subnet mask within an IP address (e.g. the IP address 192.168.10.10 by the subnet mask 255.255.255.0 is divided into a network quota 192.168.10.0 and a host quota of 0.0.0.10). The allocation takes place via the transformation of the IP address and the subnet mask in binary form and afterwards a bit by bit one logical AND operation between IP address and subnet mask. The result is the network quota of the IP address. The host quota of the IP address takes place via the bit by bit logical NAND operation between IP address and subnet mask. By the variable allocation of IP addresses in network quota and host quota via subnet masks, one can specify IP address ranges individually for large and small networks. Thus one can operate large and small IP networks and connect if necessary to the Internet via a router. In smaller local networks the subnet mask 255.255.255.0 is mostly used. Network quota (the first 3 numbers) and host quota (the last number) are simple here without much mathematical expenditure to determine and it can with these subnet mask up to 254 network elements (e.g. measuring instruments, hosts/PC's...) in a network be operated at the same time.

Often also a standard gateway is present in a network. In most local networks is this gateway with the router to the Internet (DSL router, ISDN router, ...) identical. Using this (gateway -) router a connection can be manufactured with another network. Thus also network elements, which are not in the same (local) network, can be reached and/or network elements from the local network are able to exchange data with network elements from other networks. For a network-spreading data exchange the IP address of the standard gateway must also be preset. In local networks, mostly the first IP address within a network for this (gateway -) router is used. Mostly routers in a local network to be used as gateway have an IP address with a „1“ in the last place of the IP address (e.g. 192.168.10.1).

5.2 Instrument settings

Please refer to the manual of the appropriate instrument for information about activating the desired interface and which interface parameters have to be set.

5.3 Instrument connection test

For the connection test from host (PC) to the Ethernet interface of the instrument, please go into the “Start” menu and select “Run”. Start the command interpreter by input the “cmd” command. Complete the input by the “Enter” key or confirm the input with „OK“.

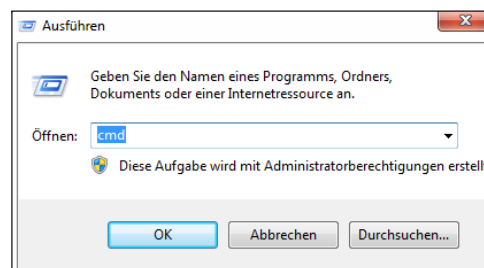


Fig. 5.2: Connection test

An input window will open. After the input character please input the “ping 192.168.10.10” (in the represented example the Ethernet interface of the instrument has the IP address 192.168.10.10) and confirm the input with Enter.

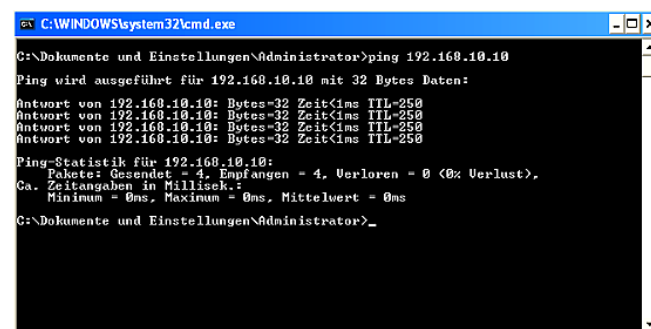


Fig. 5.3: Input window

If the Ethernet interface answers the „Ping“ without errors (please refer to the represented example), the connection is correct. If the interface answers with an error message, no connection is present or the connection is disturbed. In this case, please check all network cables between instrument and host (PC), as well as the preset interface parameters of the instrument Ethernet interface and the host (PC) Ethernet LAN interface. If the connection is controlled via further network elements, e.g. switches, routers, network servers, etc., please check these further connections, as well as the presets of the appropriate network elements.

The preset IP addresses of the instrument and the host (PC) have to be different, but have to be in the same subnet (example: instrument 192.168.010.010, PC 192.168.010.002, with subnet mask 255.255.255.000).

6 Applications

6.1 Ethernet

The Ethernet interface offers a web server, which can be used with a web browser (e.g. Internet Explorer, ...). The following functions (depending on the instrument type) are supported by the Webserver:

- Display of the device information

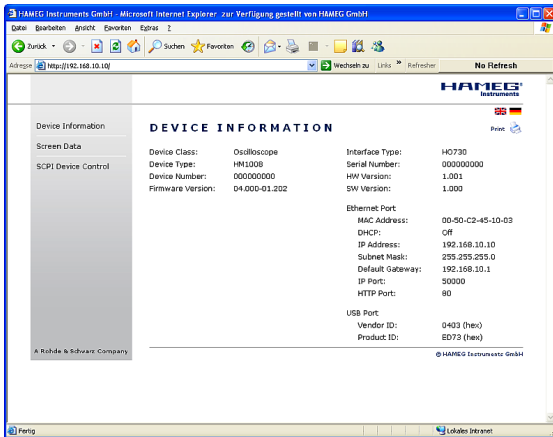


Fig. 6.1: Display of device information

- Readout and save via web browser function
- Query and control with remote commands (SCPI)

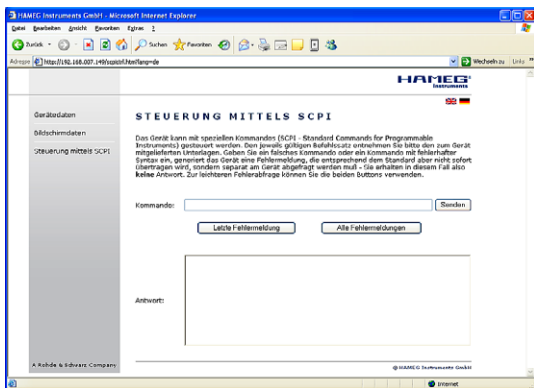


Fig. 6.2: Query and control with SCPI remote commands

Further information you can find in the appropriate instrument user or SCPI manual.

6.2 CombiScopes

The interface R&S®HO720 / R&S®HO730 can be used via USB with the application software HME Explorer in order to transfer data, setups and screenshots (in digital mode of the combiscope only). It also support the older software HMLab, provided the version 0.60 or higher is available. The Settings within HMLab must correspond to the settings of the interface. In case your available application software HMLab is a version below 0.60, please download the actual application software at www.hameg.com from the Internet and thus update your pc.

6.3 R&S®HMO series

For the R&S®HMO series the HME Explorer software is available for free on the Rohde & Schwarz website. Please refer to the software manual concerning the necessary settings and the offered feature. (e.g. transfer of settings, data and screenshots, command line for sending remote commands). The SCPI remote commands manual you can find on www.hameg.com.

6.4 R&S®HMS(-X) series

For the R&S®HMS(-X) series the HME Explorer software is available for free on the Rohde & Schwarz website. Please refer to the software manual concerning the necessary settings and the offered feature. (e.g. EMC PreCompliance measurements (HO730 not supported), transfer of screenshots, command line for sending remote commands). The SCPI remote commands manual you can find on the Rohde & Schwarz homepage.

6.5 R&S®HMF / R&S®HMP Serie

For the R&S®HMF / R&S®HMP series the HME Explorer software is available for free on the Rohde & Schwarz website. Please refer to the software manual concerning the necessary settings and the offered feature. (e.g. generate and transfer of arbitrary waveforms, transfer of screenshots, command line for sending remote commands). The SCPI remote commands manual you can also find on the Rohde & Schwarz homepage.

6.3 Remote control via software

The interfaces can be used via Ethernet (R&S®HO730) or via USB (R&S®HO720 / R&S®HO730) in conjunction with the software HME Explorer in order to transfer data (CSV module), screenshots (screenshot module) as well as a command line for sending remote commands (terminal module). The HME Explorer software is available as a free download on the Rohde & Schwarz homepage. Please refer to the HME Explorer software manual for the necessary settings and the features offered.

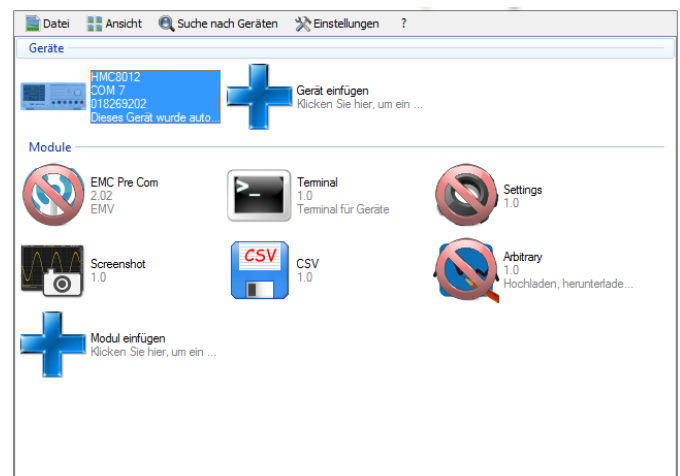


Fig. 6.3: HME Explorer Software