

ETHERNET/USB - INTERFACE H0730

Installation guidelines

English





**KONFORMITÄTSERKLÄRUNG
DECLARATION OF CONFORMITY
DECLARATION DE CONFORMITE
DECLARACIÓN DE CONFORMIDAD**

Hersteller / Manufacturer / Fabricant / Fabricante:
HAMEG Instruments GmbH · Industriestraße 6 · D-63533 Mainhausen

Die HAMEG Instruments GmbH bescheinigt die Konformität für das Produkt
The HAMEG Instruments GmbH herewith declares conformity of the product
HAMEG Instruments GmbH déclare la conformité du produit
HAMEG Instruments GmbH certifica la conformidad para el producto

Bezeichnung: Ethernet/USB-Interface
Product name: Ethernet/USB Interface
Designation: Interface Ethernet/USB
Descripción: Interfaz Ethernet/USB

Typ / Type / Type / Tipo: H0730

mit / with / avec / con: HM1008, HM1508, HM1508-2, HM2008
Optionen / Options / Options / Opciones: -

mit den folgenden Bestimmungen / with applicable regulations /
avec les directives suivantes / con las siguientes directivas:

EMV Richtlinie 89/336/EWG ergänzt durch 91/263/EWG, 92/31/EWG
EMC Directive 89/336/EEC amended by 91/263/EWG, 92/31/EEC
Directive EMC 89/336/CEE amendée par 91/263/EWG, 92/31/CEE
Directiva EMC 89/336/CEE enmendada por 91/263/CEE, 92/31/CEE

Niederspannungsrichtlinie 73/23/EWG ergänzt durch 93/68/EWG
Low-Voltage Equipment Directive 73/23/EEC amended by 93/68/EEC
Directive des équipements basse tension 73/23/CEE amendée par 93/68/CEE
Directiva de equipos de baja tensión 73/23/CEE enmendada por 93/68/EWG

Angewendete harmonisierte Normen / Harmonized standards applied /
Normes harmonisées utilisées / Normas armonizadas utilizadas:

Sicherheit / Safety / Sécurité / Seguridad:

EN 61010-1:2001 / IEC (CEI) 1010-1:2001
Überspannungskategorie / Overvoltage category / Catégorie de surtension /
Categoría de sobretensión: II

Verschmutzungsgrad / Degree of pollution / Degré de pollution / Nivel de
polución: 2

Elektromagnetische Verträglichkeit / Electromagnetic compatibility /
Compatibilité électromagnétique / Compatibilidad electromagnética:

EN 61326-1/A1: Störaussendung / Radiation / Emission: Tabelle / table /
tableau 4; Klasse / Class / Classe / classe B.

Störfestigkeit / Immunity / Imunitee / inmunidad:
Tabelle / table / tableau / tabla A1.

EN 61000-3-2/A14: Oberschwingungsströme / Harmonic current emissions
/ Émissions de courant harmonique / emisión de corrientes armónicas:
Klasse / Class / Classe / class D.

EN 61000-3-3: Spannungsschwankungen u. Flicker / Voltage fluctuations
and flicker / Fluctuations de tension et du flicker / fluctuaciones de tensión
y flicker.

Datum / Date / Date / Fecha
26. 09. 2006

Unterschrift / Signature / Signatur / Signatura

Manuel Roth
Manager

General information regarding the CE marking

HAMEG instruments fulfill the regulations of the EMC directive. The conformity test made by HAMEG is based on the actual generic- and product standards. In cases where different limit values are applicable, HAMEG applies the severer standard. For emission the limits for residential, commercial and light industry are applied. Regarding the immunity (susceptibility) the limits for industrial environment have been used.

The measuring- and data lines of the instrument have much influence on emission and immunity and therefore on meeting the acceptance limits. For different applications the lines and/or cables used may be different. For measurement operation the following hints and conditions regarding emission and immunity should be observed:

1. Data cables

For the connection between instruments resp. their interfaces and external devices, (computer, printer etc.) sufficiently screened cables must be used. Without a special instruction in the manual for a reduced cable length, the maximum cable length of a dataline must be less than 3 meters and not be used outside buildings. If an interface has several connectors only one connector must have a connection to a cable. Basically interconnections must have a double screening. For IEEE-bus purposes the double screened cables HZ72S and HZ72L from HAMEG are suitable.

2. Signal cables

Basically test leads for signal interconnection between test point and instrument should be as short as possible. Without instruction in the manual for a shorter length, signal lines must be less than 3 meters and not be used outside buildings. Signal lines must be screened (coaxial cable - RG58/U). A proper ground connection is required. In combination with signal generators double screened cables (RG223/U, RG214/U) must be used.

3. Influence on measuring instruments.

Under the presence of strong high frequency electric or magnetic fields, even with careful setup of the measuring equipment an influence of such signals is unavoidable. This will not cause damage or put the instrument out of operation. Small deviations of the measuring value (reading) exceeding the instruments specifications may result from such conditions in individual cases.

HAMEG Instruments GmbH

English	
Declaration of conformity	2
General information regarding the CE marking	2
2. Safety Hints	4
3. Interface Description	4
3.1 Ethernet	4
3.2 USB	4
4. Oscilloscope Firmware	4
5. Interface Fitting Instruction	5
5.1 Removing the existing interface	5
5.2 Fitting the interface H0730	5
6. Interface Selection	6
7. USB-Driver Installation	7
7.1 Installation under Windows XP:	7
8. Ethernet configuration	9
8.1 IP networks (IP – Internet protocol)	9
8.2 Ethernet interface parameters at the oscilloscope	10
8.3 Ethernet interface parameters at the host (PC)	11
8.4 Test of the connection to the oscilloscope	12
9. Application	12

2. Safety Hints



Attention!

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



Attention!

During operation the interface opening must be closed.



Attention!

All interface connections are galvanically connected to the scope.



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

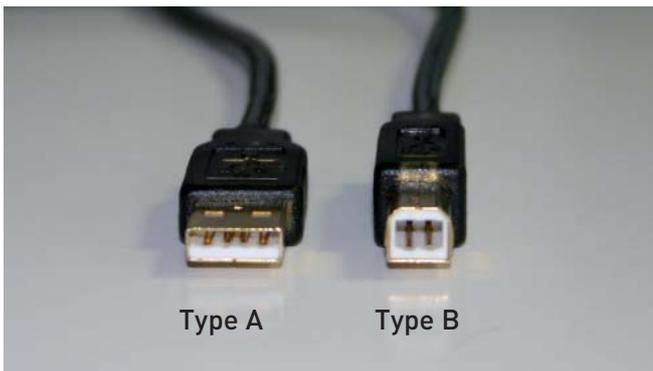
If the safety rules are disregarded, any damage to HAMEG Instruments GmbH products will void the warranty. Consequently HAMEG Instruments GmbH will not take any responsibility for damage to people or equipment of other make.

3. Interface Description

H0730 is a DUAL Interface that can be used either as an Ethernet or as a USB 2.0 / 1.1 Interface. It is used with the HAMEG CombiScopes HM1008 and HM1508 for data transfer and oscilloscope control. Only one function (Ethernet or USB) - not both at the same time - can be activated (see item 6 "Interface Selection").

3.1 Ethernet

The interface 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.



3.2 USB

The interface is equipped with a Type A USB female connector. For direct connection with a host controller or an indirect connection via a USB hub, a USB cable is required, equipped with Type B male connector one end and a Type A male connector at the other..

4. Oscilloscope Firmware

4.1 It is absolutely necessary to check the oscilloscope firmware version before fitting the Interface H0730. 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.". Alternatively the firmware version of the oscilloscope can be found in the menu „Software“ by operation of the PROBE ADJ key > menu „Information“ > menu „Software“ (MC-Version:).

4.2 If the firmware version is 04.000-yy.yyy or higher, continue the interface fitting as described under item 5 (Interface Fitting Instruction). In the case of firmware versions below 04.000-yy.yyy, H0730 will not be recognised and a firmware update is required as described under item 4.3.

4.3 In case of a firmware version below 04.000-yy.yyy, please download the current firmware at www.hameg.com from the Internet and update the oscilloscope. The firmware can be found and downloaded under: Products > Oscilloscopes > [oscilloscope type] > Software/Firmware (below the oscilloscope picture) > Firmware_HMxxx_Vxxx.zip.

After receiving the current firmware and its installation instruction, the firmware installation must be done via the RS-232 interface H0710 or the RS-232 port of the interface H0720. If the current firmware is installed, future updates can also be made over the USB port of the interface H0730.

5. Interface Fitting Instruction



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!

5.1 Removing the existing interface



5.1.1 Remove both fastening screws.



5.1.2 Pull out the interface.

5.2 Fitting the interface H0730

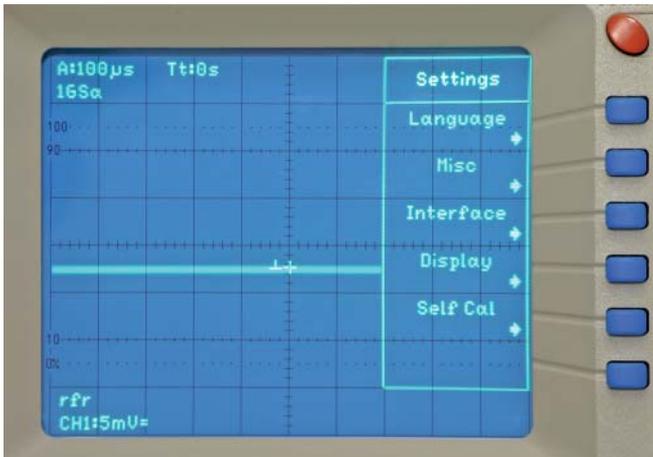


5.2.1 Insert the interface H0730 in the opening in such a way, that the PCB will be inserted in the guides - visible on both sides - and push it in completely.



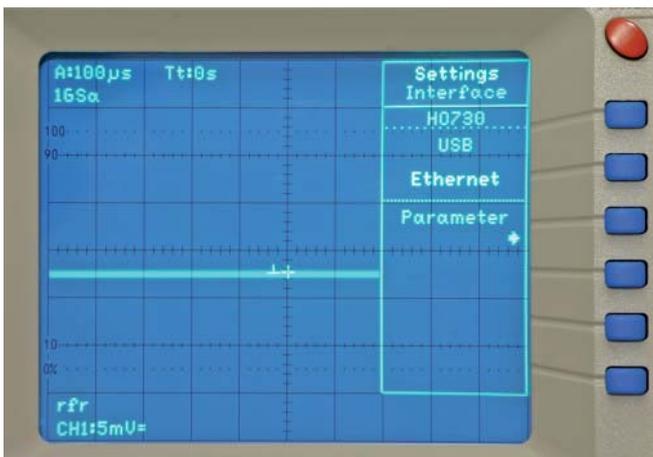
5.2.2 Fit the interface with the fastening screws previously (item 4.1.1) removed.

6. Interface Selection



6.1 Interface Selection

Press the SETTINGS pushbutton to call the "Settings" menu. The function key "Interface" opens the submenu "Settings Interface" consisting of the menu items USB and Ethernet.

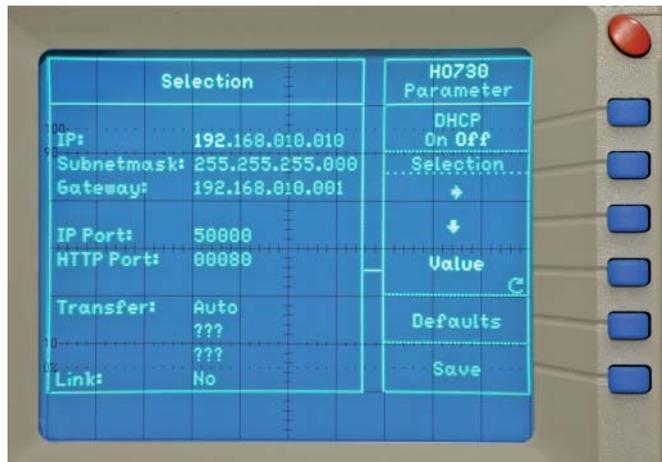


6.1.1 Ethernet

If Ethernet is highlighted, this interface is activated. With the activating of Ethernet the menu option „Parameter“ also appears additional in the Readout, which the Ethernet interface parameter settings made possible (see section 8).

Reference!

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.



6.1.2 USB

USB is selected when highlighted. Further settings are not required.

7. USB-Driver Installation



Attention!

The H0730 USB driver can be installed only on the PC, if the following conditions are fulfilled:

- 1st: A Combiscope with USB interface H0730 fitted and activated is attached at the PC.
- 2nd: Operating system Windows 2000 or XP is used.

Providing a connection between PC and oscilloscope has been established and there is no H0730 driver installed, the operating system answers "Found New Hardware". In addition the "Found New Hardware Wizard" is displayed. Only in this case the USB-Driver must be installed.

The USB Driver is located in the directory "H0730_D2xx_Driver"

7.1 Installation under Windows XP:



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

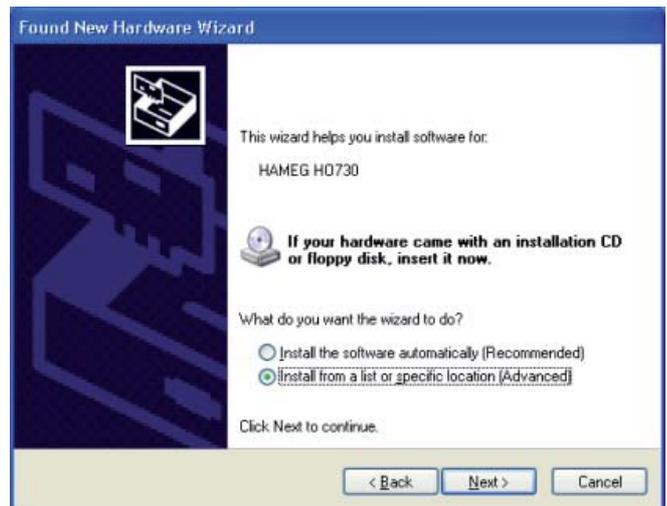


7.1.2 Select "Install the software automatically (Recommended)" and click "Next".

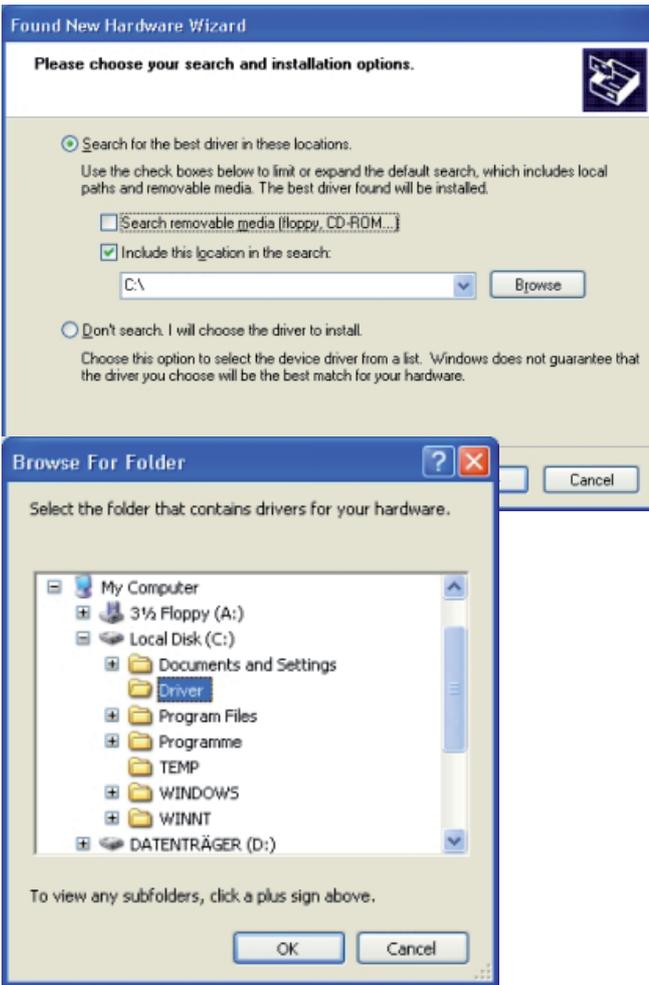


7.1.3 The wizard now searches for HAMEG H0730. If the driver software has been found, please continue with item 7.1.4.

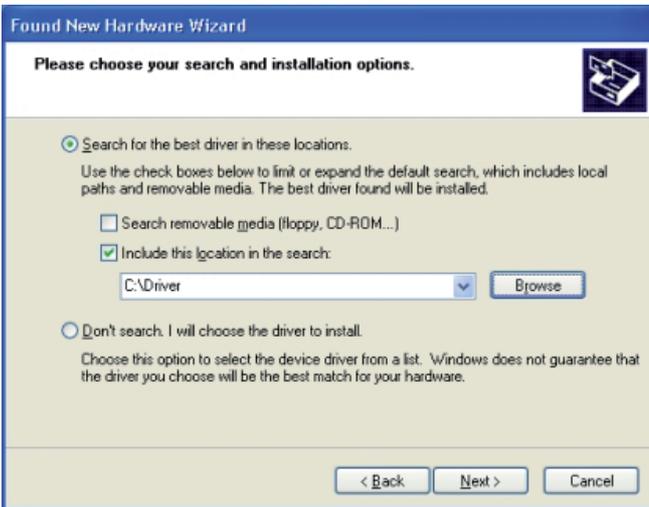
7.1.3.1 If the driver software has not been found, the message "The wizard could not find the software for ... ? HAMEG H0730" is displayed. Please click "Back" until item 7.1.2 is displayed.



7.1.3.2 Select "Install from a list or specific location (Advanced)" and click "Next".

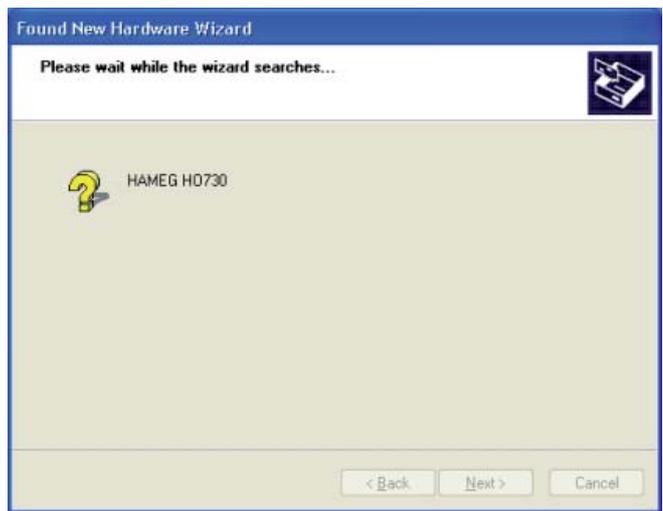


7.1.3.3 "Browse" for the selected drive and select the folder containing the driver. Confirm with "OK".

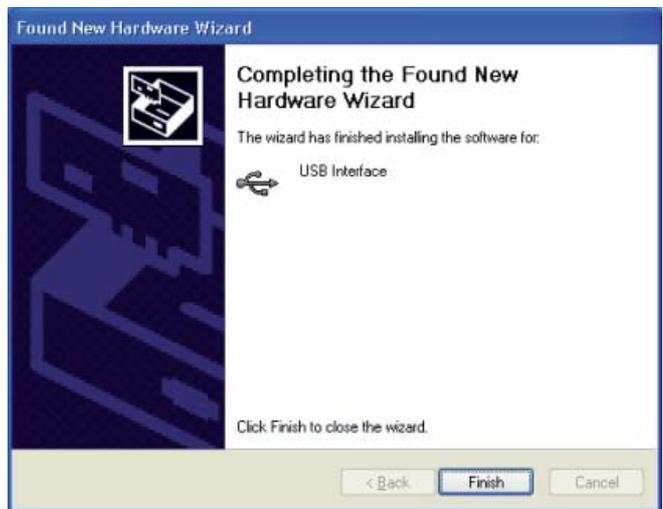


7.1.3.4 After the selected path is displayed click "Next".

7.1.4 Thereafter the "Hardware Installation" window is displayed, showing a warning to continue the installation procedure. As this warning is irrelevant in case of H0730 driver software, click „Continue Anyway“.



7.1.5 The wizard installs the driver software.



7.1.6 Please click "Finish" to complete the installation.

8. Ethernet configuration



Reference!

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.

8.1 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 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 oscilloscope and a private IP address for the host (PC), with which you would like to control the oscilloscope. 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).

Table 1: Private IP address ranges

address range	subnetz 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	192.168.0.0/16	$2^{16} - 2 = 65.534$
	255.255.255.0	192.168.0.0/24	$2^8 - 2 = 254$

Table 2: Classes of IP addresses

class	address 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			

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 automatically (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 oscilloscope) is connected by a network cable directly with a host (PC), the IP addresses cannot be assigned to the oscilloscope and the host (PC) automatically, since no network with DHCP server is present here. They have to be preset therefore at the oscilloscope 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, ...) is 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).

8.2 Ethernet interface parameters at the oscilloscope

The Ethernet interface parameters are preset in the oscilloscope with activated Ethernet interface in the menu "SETTINGS" "INTERFACE" "ETHERNET PARAMETER" to be preset. The Ethernet interface parameters have to agree with the software HMLab and/or the parameters of the Ethernet LAN interface at the host (PC).

Reference! The preset IP addresses in the oscilloscope and the host (PC) have to be different and be in the same subnet (ex.: oscilloscope 192.168.010.010, PC 192.168.010.002, with subnet mask 255.255.255.000).

With activated DHCP function the parameters IP address, subnet mask and gateway will be automatic by an existing DHCP server in the network.

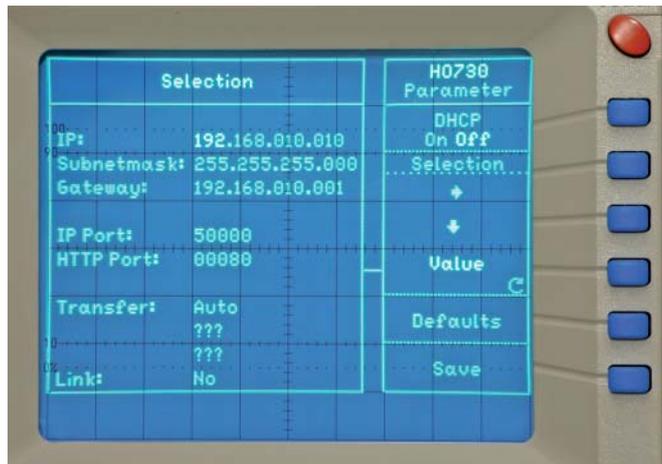
With deactivated DHCP function the parameters at the Ethernet interface can be preset manually.

Reference! If the oscilloscope is connected by a network cable directly with a host (PC), the DHCP function has to be deactivated, since no network with DHCP server is present. Without DHCP server no interface parameters can be made available to the oscilloscope and the host (PC) automatically.

Selecting an interface parameter takes place with the function key ↓ .

Selecting the position within an interface parameter takes place with the function key → .

The highlighted parameter value is then preset with the „IN-TENS“ rotation control to the desired value. The menu option "Save" in the Readout saves the preset interface parameters by the oscilloscope and/or determined automatically after press the menu option "Save" with activated DHCP function and stored until changed. The menu option "Defaults" in the Readout, restores the factory-installed preset interface parameters.



The represented interface parameters have the following meaning:

- IP: The IP address of the oscilloscope (default setting: 192.168.010.010).
- Subnet mask: The subnet mask marks the firm network quota and the variable host quota of the IP address of the oscilloscope (default setting: 255.255.255.000). General is to be considered: Within a local network (LAN) the preset subnet mask has to be alike with all attached network elements. That applies to oscilloscope and host (PC), if they are in the same local network.
- Gateway: The IP address of the gateway (e.g. an existing router) in the network, in order to make a connection possible with another network (default setting: 192.168.010.001).
- IP Port: For the software HMLab or for internally developed TCP (or UDP) applications, can be set the used IP Port. Thus the oscilloscope can be addressed via the preset IP Port directly by an application e.g. 192.168.010.010:50000 (default setting: IP Port 50000). Port settings are possible within the range of 1024 - 65535.
- HTTP Port: The HTTP Port for Web browser (default setting: HTTP Port 00080). Port settings are possible within the range of 0 - 65535.
- Transfer: The transmission rate of the Ethernet interface (default setting: Auto). In the preset „Auto“ the highest possible transmission rate of the receiving station is selected. If an automatic preset is not possible, transmission rate and the transmission method can be set manually to the following values: 10Mbit/s half duplex, 10Mbit/s full duplex, 100Mbit/s half duplex or 100Mbit/s full duplex. As a check on RJ-45 socket the up-to-date preset transmission rate of the Ethernet interface can be read off in the Readout or from the two light emitting diodes (LED). The yellow LED shines with a transmission rate of 10Mbit/s. The yellow and green LED shines with a transmission rate 100Mbit/s.
- Link: The status of the connection between the Ethernet interface of the oscilloscope and the network interface of a receiving station [connection active: Yes, connection not active: No].



Reference!

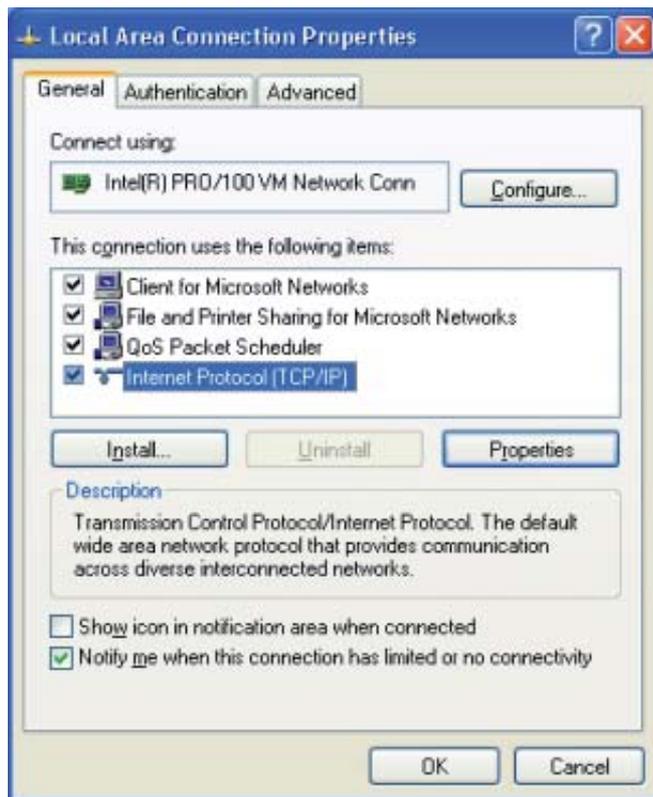
The MAC address (network card address) of the Ethernet interface can be queried over the menu „Component tester > Information > Interface“.

8.3 Ethernet interface parameters at the host (PC)

8.3.1 Parameters under Windows XP

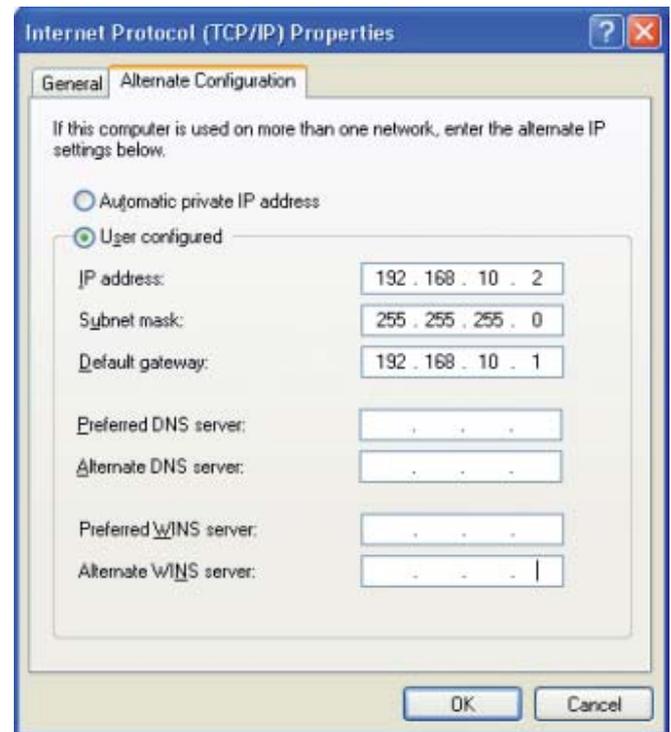
Reference! In order to be able to accomplish the following parameters, you have to be announced at the host concerned (PC) as "administrator", or you have to be member of the user group "administrators" (e.g. in the network).

To preset the interface parameters of the Ethernet LAN interface at the host PC please go to "Start" menu and select under the menu "Control Panel" > „Network connections" the menu "Local Area Connection". In the new opened window to "Local Area Connection Properties" please click on "Internet Protocol (TCP/IP)" and click on "Properties".



In the new opened window "Internet Protocol (TCP/IP) Properties" please click on "Alternative Configuration" and select the option "User configured" for the manual preset of the network parameters. In the input field „IP address:" please enter from your (or from a network administrator specified) IP address for the PC (e.g. 192.168.10.2). In the input field "Subnet mask" please enter from your (or from a network administrator specified) subnet mask for the PC (e.g. 255.255.255.0). In the input field "Default gateway" please enter your (or from a network administrator specified) IP address of the gateway (e.g. the IP address of the router of its LAN network). With a direct connection of oscilloscope and host (PC) over a network cable this input is optional.

Reference! The preset IP addresses at the oscilloscope and at the host (PC) have to be different and be in the same subnet (ex.: oscilloscope 192.168.010.010, PC 192.168.010.002, with subnet mask 255.255.255.000).



If you attached the oscilloscope and the host (PC) to a network with existing DHCP server (with activated DHCP function), the presets for IP address, subnet mask and gateway of the existing DHCP server are assigned dynamically automatically. In this case you don't need the described manual presets of IP address, subnet mask and gateway. In the opened window "Internet Protocol (TCP/IP) Properties" please click on „Alternate Configuration" and select the option „Automatic private IP address".



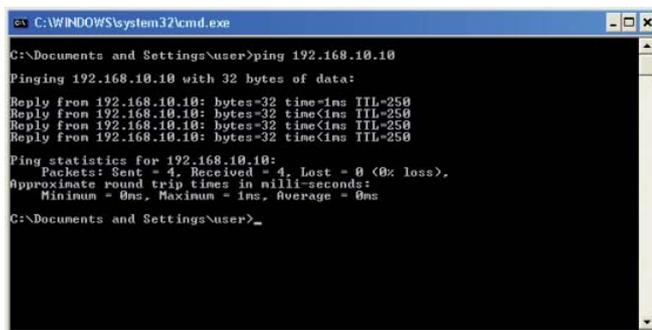
After the presets you confirm the inputs please click „OK".

8.4 Test of the connection to the oscilloscope

For the test of the connection of the host (PC) to the Ethernet interface of the oscilloscope, please go into the menu "Start" and select "Run". Start the command interpreter by the input of the instruction "cmd" into the input field. Complete the sequence by the "Enter" key or confirm the input by clicking OK.



It opens an input window. After the input character you give to confirm the instruction "ping 192.168.10.10" (in the represented example the Ethernet interface of the oscilloscope has the IP address 192.168.10.10) and confirm the input with Enter.



If the Ethernet interface answers the example represented by the oscilloscope to the "Ping" instruction without errors as in, the connection is correct. If the interface does not answer attainable e.g. with an error message, no connection is present or the connection is disturbed. In this case please examine all network cables between oscilloscope and host (PC), as well as the preset interface parameters of the Ethernet interface with the oscilloscope and the Ethernet LAN interface with the host (PC). If the connection over further network elements e.g. switches, routers, network servers, etc. is used, examine if necessary these further connections, as well as the presets of the appropriate network elements.

9. Application

In combination with HMLab 1.0 or higher, the interface H0730 can be used via Ethernet as well as USB. The HMLab settings have to correspond with the interface settings of the oscilloscope. With HMLab an oscilloscope or several oscilloscopes can be operated at the same time, if these are connected by a common LAN network. Likewise an oscilloscope or also several oscilloscopes can be operated at the same time, if they are attached over USB or the LAN-/WAN networks are distributed over several LAN-/WAN networks among themselves with switches and/or routers (e.g. over the Internet) connected.

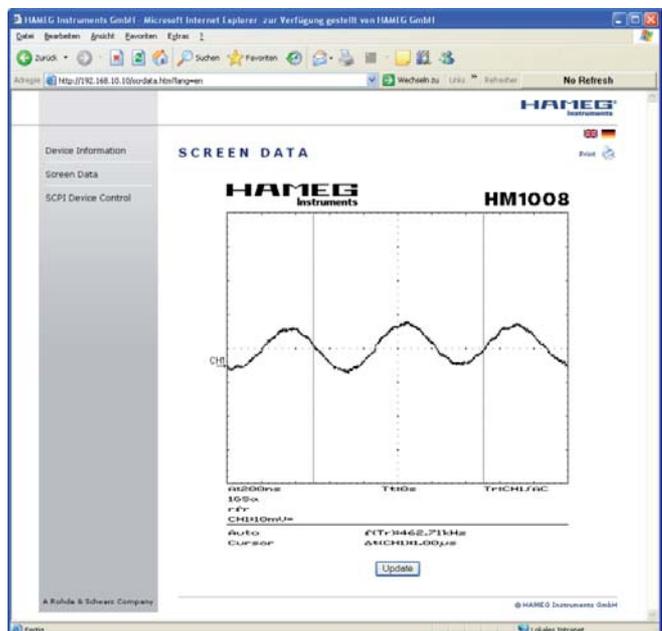
The interface H0730 has also a Web server, which can be used with a Web browser (e.g. Internet Explorer, ...). The following functions are supported by the Web server (only in digital mode):

- Indicate the equipment data
- Selections of the Readout and save over Web browser function
- Control and inquiry with programming instructions (SCPI instructions) over input mask

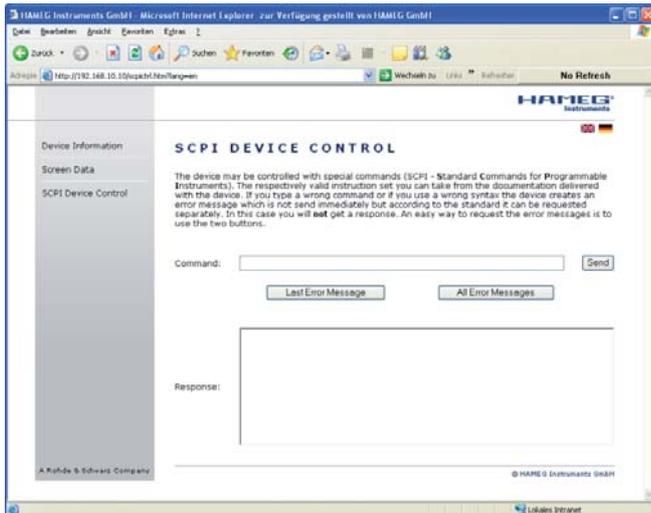
Indicate the equipment data



Selections of the Readout and save over Web browser function



Control and inquiry with programming instructions (SCPI instructions) over input mask



If the present HMLab version is below 1.0 the current version can be found in the Internet (www.hameg.com) for downloading and updating your PC. The path of the software is: Products > Oscilloscopes > (oscilloscope type) > Software/Firmware (below the oscilloscope picture) > Software/Firmware (below the oscilloscope picture) > HMLab.zip.

The programming commands list will be provided in the Internet under www.hameg.com.

Mainhausen, Germany

August 2006



Oscilloscopes



Spectrum Analyzer



Power Supplies



Modular System
8000 Series



Programmable Instruments
8100 Series



authorized dealer

w w w . h a m e g . d e

Subject to change without notice
29-09-2006-gw

© HAMEG Instruments GmbH
A Rohde & Schwarz Company
® registered trademark



DQS-Certification: DIN EN ISO 9001:2000
Reg.-Nr.: 071040 QM

HAMEG Instruments GmbH
Industriestraße 6
D-63533 Mainhausen
Tel +49 (0) 61 82 800-0
Fax +49 (0) 61 82 800-100
sales@hameg.de