RH 2030, RH 2035, RH 2010 van der Pauw and Hall

Installation Manual

Version 4.1, 2015-01-30

Contents

Introduction

This manual explains only the software installation, the hardware installation will be described in the hardware manual.

The installation program calls automatically in different steps 4 input windows:

1. Software base installation (copy files to hard disk)
2. Set registry and drivers (Windows)
3. SetUp configuration
4. Windows user access rights

Changes in step 2 to 4 can also be done after installation in separate programs. At the most input windows you get help information by the F1-key.

If you need an IEEE board or IEEE-USB converter, install first its driver, then install the board resp. connect IEEE-USB converter to the PC, then make the installation of the Hall software.
If you need an USB to RS232 or to LAN converter for the cryosystem, install the driver before connecting this converter.
Additional drivers for a temperature controller, for an USB to RS232 converter or for an USB to LAN converter may be on your PhysTech CD.

Do not connect the USB cable to the measure system before software installation**.**
Connect it after step 2, if the installation was finished.

The software is protected by an electronic protection key. The new protection keys are for the USB port, the old ones for the Parallel LPT port. Except the lite programs the main program will not start without this key. You get one key for the measurement program, and at the RH2030 a second one for the simulation program. **Do not plug in the protection key** into a USB port of your computer before software installation. Connect it after step 2, when you get the SetUp configuration window (step 3) on your screen.

For the software installation you need **Windows administrator rights.**
Administrator rights are not necessary for the main Hall program.

Minimal system requirements:
Processor: 1 GHz
Hard disk free space: 300 MB
Video resolution: 800 x 600, better 1024 x 768
Operating system: Windows 2000, XP, Vista 32/64 Bit, Seven 32/64 Bit, 8.X 32/64 Bit
USB: 2 free ports
PDF help: Adobe Acrobat reader, FoxitReader, Sumatra or plug-in for the Web browser

Note: The measurement software doesn't work under **64 Bit Windows** with the 2030/ 2035 version A Hall system, see convention below. But the RH 2030 and RH 2035 version B work under 64 Bit, the simulation/ evaluation software works always at a 64 Bit OS.

You should use always the newest program version, see chapter 5.2 for **updating**.

This manual is the 2. part of the main **Hall documentation set**:

1) **Hardware manual H**
2) **Installation manual I** (this manual)
3) **Software manual S**
4) **Basics manual B**
5) **Theory manual T**

In the most menus and input windows you get **help** information by the F1-key. Then the electronic manual will be opened at the corresponding page. For this you need a PDF viewer, either the Adobe Reader, the Foxit Reader or the Sumatra Portable, or a plug-in for your Web browser.
At some input windows there is a help button. It have the same function as the F1-key. You get help information by the F1-key also if there is no help button!

Reference to another chapter of this manual will be denoted only by this chapter, for example 1.1. If there is a reference to another manual the type of this manual will be additionally given, for example S3.1 for chapter 3.1 of the software manual. The chapter reference inside this manual is in many cases a hyperlink, that means if you click onto the blue chapter number, the document jumps to this chapter.

After the first start of the Hall program you should make the **calibration** of the magnetic field and of the offset voltage, see chapter S1.1.7 and S4.2 of the Software Manual.

Convention: The old Hall systems (**version A**) are labeled at the front as RH 2030 resp. RH 2035, or these come without a label. In the following these old systems will be called RH 2030 resp. RH 2035 version A. The new Hall systems (**version B**) are labeled at the front as RH 2030 resp. RH 2035 and at the rear as version B. In the following these new systems will be called RH 2030 resp. RH 2035 version B. Without an expression of the version, RH 2030 resp. RH 2035 means version A and B. The description is then valid for both versions.
The USB driver and the case are the difference between the version A and B. So all descriptions except for the USB in this manual are valid for both systems.
All descriptions for the RH 2030 in this manual are also valid for the RH 2010 except the USB and IEEE interface.

1. Software base installation

For the software installation please follow the schedule below:

1. Install the Hall hardware.

2. Do not connect the USB cable to the measure system at this time. Do not plug in the software measurement key into a USB port of your computer system at this time.

3. Insert the Hall CD into your CD drive and close it. Start the installation program from the explorer, 'Install' is the name of our Hall software installation program.
The installation program is coming up with the following input window:
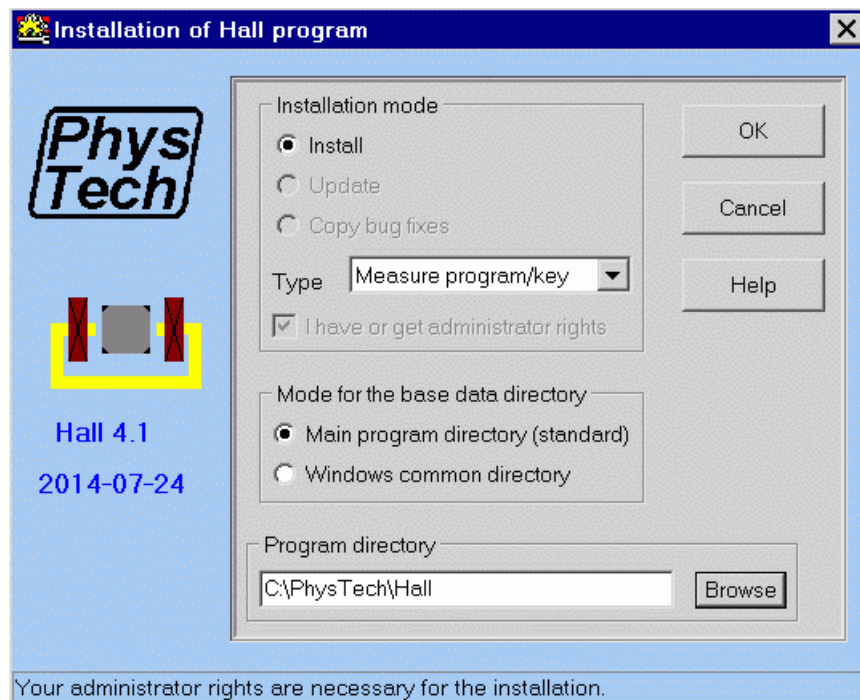
1.1 Quick installation guide

You get at the installation some input windows. Some things can be defined here, normally the default values are sufficient. So you can confirm resp. start always with the 'OK' button without any change. There are 2 exceptions. If your temperature controller need a IEEE connection then you have to select the IEEE board in the Hardware tab sheet of the Setup configuration (chapter 3.3). In the Cryo tab sheet of the Setup configuration (chapter 3.4) you should always check the type of cryo system, its address and the minimal and maximal temperature.
Plug in the protection key into a USB port of your computer if you see the SetUp configuration window. Connect the USB cable to the measure system after complete installation.

Using the 'OK'button at the window 'Installation of Hall program' starts the installation with copying the files.

1.2 Installation mode and type

Following **installation modes** exist:

- **'Install'** means the complete new installation of this software. Even if there is an installed version on the PC the installation will be done and all program files will be overwritten. **Data files will not be deleted in any case!**
- **'Update'** means, if you have received a new software version or if you have downloaded it from our homepage www.PhysTech.de, all program files will be installed newly except the customer system files. All user definable files (personal init files) are left unchanged if possible. At selecting update you see a check box 'Save old version'. You should use this option if you have not saved your old version. The old version will be copied to the sub directory HallOld. If you want to start the old version, go by the explorer to the directory HallOld\Bin and start there Hall. You can have different versions on your PC.
- **'Copy bugfixes'** means that only the new and debugged program files will be installed. The bugfix is also a service package.

Following **installation types** exist:

- **'Measure program/key'** is the standard type. This is for the measurement program. You need here the protection (software protection) key for measurement.
- **'Simulation program/key'** is for the simulation protection key. With this installation you can only simulate measurements and evaluate data files.
- **'Lite program, no key'** means that you work without any protection key. With this installation you can only simulate measurements and evaluate your data files. For the first start you need the protection key for measurement. After this the lite licence file is 400 days valid. After this time you have to refresh your lite licence by your measurement protection key. It will be done automatically after start.
- **'Lite program, portable'** is similar to the normal lite program but it is designed for USB sticks. No driver or other files will be saved in the Windows directories.
- **'Lite program, server'** is similar to the portable lite program but it is designed for a server.

The check box '**I have or get administrator rights**' may be enabled, depending on the installation mode and type:

- **Install, measure program**: The check box is not enabled, administrator rights are always necessary for the installation.
- **Install, simulation or lite program**: The check box is enabled when using the green Sentinel protection key. Administrator rights are always necessary at the installation for the blue Hardlock protection key.
- **Install, portable lite program**: The check box is not enabled, administrator rights are not necessary.
- **Update**: The check box is enabled except for the portable lite program. No new drivers will be installed when this check box is deactivated.
- **Copy bugfixes**: The check box isn't enabled, administrator rights aren't necessary.

If administrator rights are necessary, you get this information in the status line. Then or when the check box is activated, the program Set_Reg will be started after copying the files, see chapter 2.1.

1.3 Mode for the base data directory

With this input you define where user measurement data and user initialization files will be saved. Here you have only 2 possibilities. After the installation you can change this input in the program Set_Conf. There you have more possibilities.

- **'Main program directory (standard)'** means that the base data directory is a sub directory of the main program directory. Our preferential mode is this one.
- **'Windows common directory'** means that the data files will be saved in the Windows common directory for all users. The Windows guide lines prefer this mode.

Examples for installation directories:

Parameter is the mode for the base data directory. The path in the following first lines exclude Bin is the program directory and is user defined. Data means the common data directory. UserX is the personal user data directory.
In the following example is UserX a sub directory of the base data path. You can select for this directory also the Windows Personal directory or input the path, see chapter 3.1.3 and Software Manual 1.1.5. The library path Lib can be changed in HardSoft configuration file. PhysTech is the main program directory in example 1, PhysTech\Hall the base program directory, PhysTech\HallData the base data directory.
At an update only the files in Bin and Sys will be overwritten, but not in Conf, Work and the data directories.

1) Main program directory (standard):
```
  PhysTech - Hall - Bin
                  - Sys
                  - Conf
                  - Work
                  - Diag
         - HallData - Data
                  - UserX
```

2) Windows common directory:
```
  Programs\PhysTech   -   Hall - Bin
                               - Sys
                               - Conf
  CommonFiles\PhysTech - Hall - Work
                               - Diag
                 - HallData  - Data
                               - UserX
```
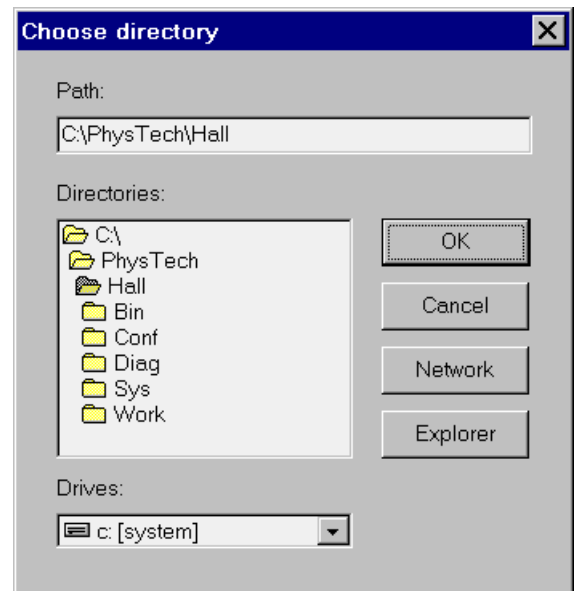
1.4 Program directory

If the default path 'C:\PhysTech\Hall' can not be used for any reason, the path can be changed using this input or the 'Browse' button. The program is then coming up with the following input window.

The program path can directly be defined by keyboard input. Drive and higher folders can be selected by browsing through the file structure as known from Windows. Drive and folders are automatically shown in the input line at the top, only the Hall program folders name has to be added. With the button 'Network' you get the Windows network dialog, 'Explorer' opens the Windows explorer.
Using the 'O.K.' button the path will be overtaken, and the software returns to the previous input window.

Note: If you have selected in 1.3 the standard mode 1, don't select as program directory the *Windows program directory* because you get problems with the Windows access rights. Then administrator rights are necessary for an update.

If the program directory is a sub directory of the *Windows Program directory* (C:\Program Files\PhysTech\Hall), higher administrator rights are necessary. Therefor a restart of the installation program is necessary. This will automatically be done after confirming, see window on the right.
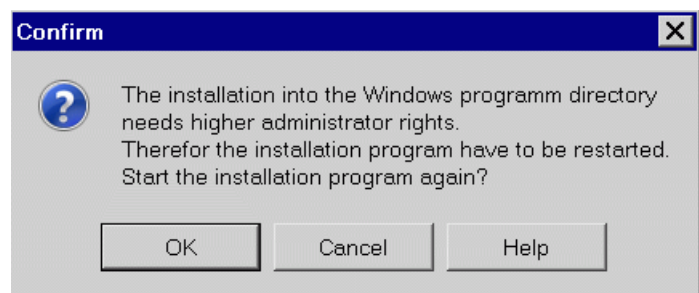
1.5 Installation from program package

If you want to make a complete new installation at a new PC and you don't find your CD, you can use the full program package HI_Inst.Exe, download it from our homepage. Copy this file in a temporary directory, for example C:\Hall_Ins, and run there this program. It is a self-extracting Zip-file. You get there an input window for confirming to unpack the files. After unpacking call the program Install.Exe as described above. During the installation the program ask you for your licence package, input there the name of your licence package. This file has the name HIXX_NNN.Zip, where XX is the licence version number and NNN is your licence number, for example HI32_001.Zip for licence version 3.2 and licence number 1. You find your licence package on the root directory of your CD or in the installation of your old PC in the directory Hall\Sys\Install\Zip, or you get it from PhysTech by eMail. For updating don't use directly the program package, call the update program as described in chapter 5.2.

1.6 Licence package/file

If you use the installation mode 'Install', the licence file will be copied automatically from CD if there a licence file exist. This is the normal case. If there is no licence file on your installation medium, you will be asked for the licence package/file, see chapter 5.3. If you have already a licence file installed and you make an update, no licence file will be installed again. If you want to check the licence manually start the installation with the 'OK' button while pressing the Shift-key. Then you get the following question:
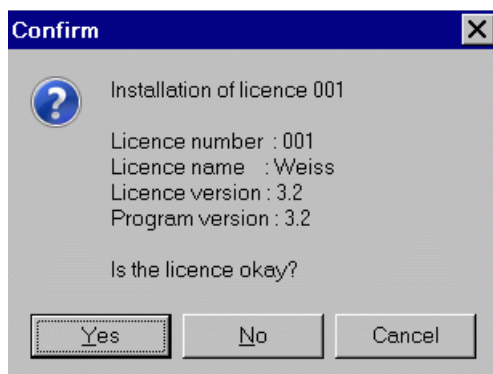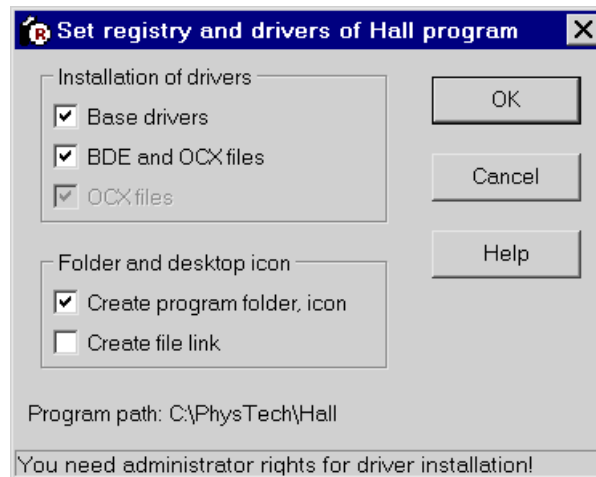

If you say 'No' then you get an input window for the licence package as in chapter 5.3.

2. Set registry and drivers

2.1 Installation of drivers

If the copying has been finished, the program comes up with the following input window. Up to now no change of the registry or files copying into a windows directory has been done.

The Hall program, except the portable program type, has to be registered in the Windows registry and all DLL's and drivers have to be copied into the windows directories (**Base drivers**). Normally the BDE (Borland database engine) will be used for the database. With '**BDE and OCX files**' it will be installed. OCX files are used only for some special tools in the plot program.

'**Create program folder and icon**' means that a program folder will be created and the program icon will be copied onto the desktop. '**Create file link means**', that if selecting a Hall data file the Hall program will automatically loaded for opening it. Because the start up procedure of the Hall program takes quite a long time, we leave it to the user to install this link.

The program path gives you the information for which directory (version) you make the installation.

With the 'OK' button the installation of drivers start. Then, if you have selected the BDE checkbox, the installation program of the BDE starts. Click here always 'Next', 'Finish' and 'OK'. No changes here are necessary. The BDE is only necessary for the database, measurements are possible without the BDE. If there are problems to install the BDE, try it again after installation (chapter 2.2). If an installation should not be possible, use the ADO-OLE driver for the database, see 3.2.

The installation of the drivers for the hardlock protection key need some seconds. After the installation of these drivers you see for a short time an information box.

2.2 Separate program

You can also start this part as separate program (not as a part of installation), called **Set_Reg**. This can be necessary after re-installation of Windows or a removal to a new PC. All Windows drivers for Hall can be installed here. In this case you get a little bit other input window with an additional 'Tools'-button.

'New base drivers' means that only drivers will be installed and registered resp. copied into the Windows directory if they are newer at the installed ones.

Other options were already explained on the previous page.

By clicking on the **'Tools'** button you get a menu with some installation possibilities. In all cases the drivers will be installed again also if they are already installed.

'Change Windows access rights' opens an input window for changing access rights of Windows operating system (see chapter 4.3).

'External Hardlock installation' calls the program HASPUserSetup of the hardlock key manufacturer Aladdin (www.safenet-inc.com). Use it if the hardlock protection key will not be found after the normal installation. It is not included in the program (update) package but in the optional package and new CD.

'External Hall USB driver installation' installs the driver for the Hall USB interface of the RH2030/2035 version B by a program of FTDI (www.ftdichip.com). Use it if the standard installation doesn't work.
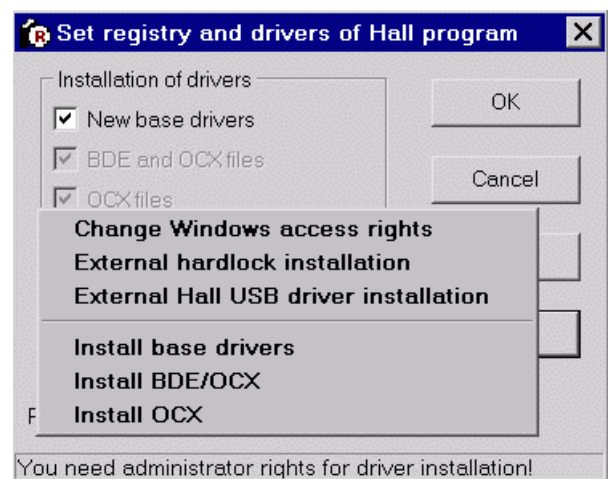
By **'Install base drivers'** the newest base drivers will be installed again resp. copied into the Windows directory.

You start one of these tools by clicking onto its menu entry, for example 'External hardlock installation', not by clicking onto the 'OK' button. Except for the Windows access rights, you get first an information that the separate call of this function (external program) is normally not necessary. Click here on the 'Yes' button to start the installation. A wizard opens then at the 3 external programs (Hardlock, Hall USB driver, BDE/OCX). Confirm here all questions.

2.3 Program folder

In your program folder you find after installation links to the main Hall program and some program tools, the executable files are in C:\PhysTech\Hall\Bin.
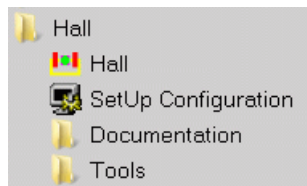
The main group contains a link to the main **Hall** program and to the Set_Conf program, this link will be called **SetUp** Configuration. This program is for the setup and changes of configuration.
Two sub folders exist with links to further program tools and to the main documentation files.

The sub folder **Tools** contains links to program tools. In the followings the link name, the program name in Hall\Bin and a short description will be listed:
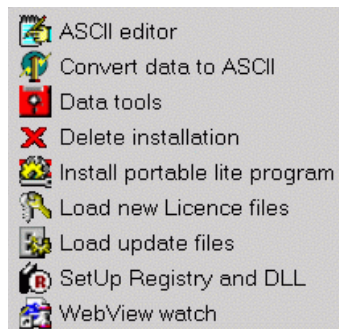
EditAsc: ASCII editor
ConvData: Convert binary data to ASCII
DataTool: Data tools
UnInst: Uninstaller
Installs the portable lite program onto an USB stick
Set_Lic: Change the customer licence
Update: Loads and installs update/bugfix files
Set_Reg: Installs drivers, Registry tools
WebWatch: Watch measurement via internet

The sub folder **Documentation** contains the most important manuals.

Information about Hall measurements and some special applications
Explains the hardware and its specifications and options
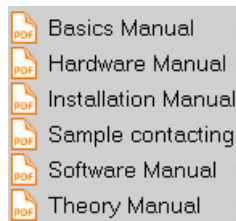Explains the software installation
Shows examples for contacting the samples
Description of the Hall program and how to use the Hall system
Short theory of Hall and its calculations

All these manuals and further documentation files are in the sub directory Hall\Sys\Doc, see chapter 7.3. You get all these documentations also in each help menu of the Hall program, see chapter S2.5 of the Software Manual.

The **desktop** contains a link to the main Hall program and a link for starting Hall tools:

Here you can start most of the tools described above. Additional buttons (last column) are for showing the important manuals, for loading PhysTech's homepage and for calling the Windows explorer. A special button starts the Hall lite program which can work simultaneously to the measurement program.

A program folder and the desktop icons for all Windows users can be created by the Set_Reg program (chapter 2.1). A program folder and the desktop icons for the current Windows user can be created by the Set_Conf program (chapter 3.7).

3. SetUp configuration

After the installation the configuration SetUp program occurs automatically. It is useful to go through the setup program, to check the software and hardware configuration, but normally it is not necessary. It can also be done later, if a modification is necessary. You find it in your program folder. If this program was started from the installation program in installation mode you get a hint that you should connect now your protection key.

3.1 Base input sheet
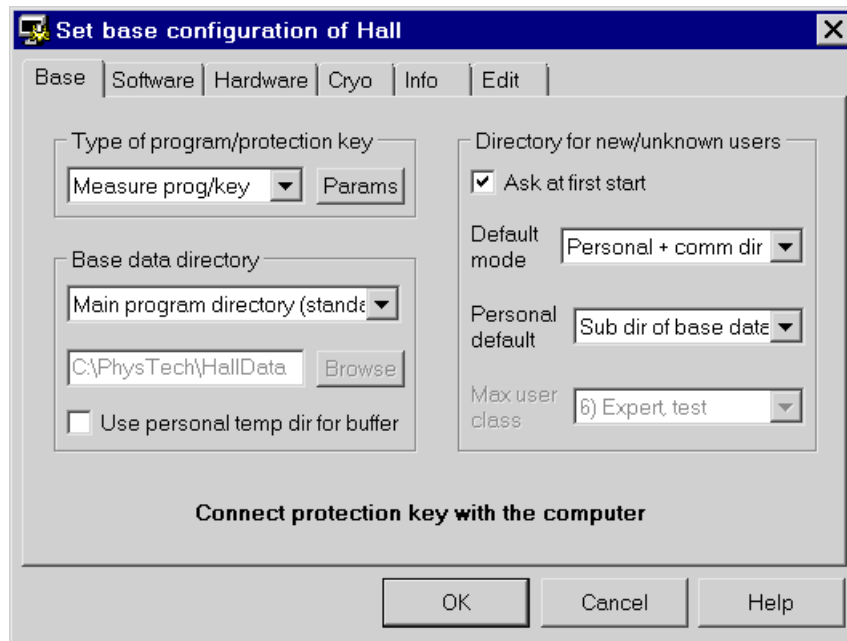
3.1.1 Type of program/protection key

Two different protection keys may be delivered with the software: the measurement key and the simulation key. The measurement key has to be connected to that computer connected to the measurement system and doing the measurements and evaluations. This is the main key. The simulation key may be connected to any other computer (maybe in the office) for an additional place for evaluating and printing the measurement results. With this key all software features are possible.

- **'Measure program/key'** is the standard type. This is for the measurement program. You need here the protection key for measurement.
- **'Simulation program/key'** is for the simulation protection key. With this installation you can only simulate measurements and evaluate data files.
- **'Lite program, no key'** means that you work without any protection key. With this installation you can only simulate measurements and evaluate your own data files. For the first start you need the protection key for measurement. After this the lite licence file is 400 days valid. After this time you have to refresh your lite licence by your measurement protection key. It will automatically be done after start.
- **'Lite program, portable**' is similar to the normal lite program but it is designed for USB sticks. No driver or other files will be saved in the Windows directories.
- **'Lite program, server**' is similar the portable program but designed for a server.

A lite program has to have attached the measurement key at the first start. After that it starts without any key for 400 days.

You can set the kind of protection key by the **'Params'** button, but usually it was done by PhysTech.

- **Hardlock, LPT port:** This is an old key for the parallel port. The search mode can be selected, automatic should be the best.
- **Hardlock, USB, blue:** This is a blue key for the USB port, called hardlock.
- **Sentinel, USB, green:** This is the newest key which we use. It is a green USB key from the company Sentinel. It needs no special driver installation because it uses the HID drivers which come since Windows 2000 with the operating system.

Note: It is not a problem when mismatching the kinds LPT and USB for the hardlock key.

3.1.2 Base data directory

This input defines where measurement data and initialization files of a user will be saved:
- **'Main program directory (standard)'** means that the base data directory is a sub directory of the main program directory.
- **'Windows common directory'** means that the data files will be saved in the Windows common directory for all users.
- **'Input of base data directory'** give the possibility to define manually the path of the base data directory, for example for the use of a network drive.
- **'Input of data/work directory'** give the possibility to define manually the path of the base data and the work directory. The work directory is then a sub directory of the base data directory instead of the program directory. The work directory contains temporary and calibration files.

'Use personal temporary directory for buffer' can be necessary if there is no directory which all users can use, a reason of missing access rights. Normally this checkbox should not be marked. But using a temporary directory can speed up the work of the portable program on a slow USB stick.

Note: Our preferential mode is the first one. The Windows guide lines prefer the second mode. In chapter 1.3 you find an example of installation directories and an explanation of directory structure.

3.1.3 Directory for new/unknown users

This input defines what happens if you start the main program with a new/unknown user name. Normally the program ask for the options, see in the Program Manual 1.1.5. This options are important for the database. You can also forbid this question and define here the options for new users. The default mode is normally 'Personal + Comm dir'. That means that the UserX can use database of his personal data directory (UserX) and of the common data directory (Data).
The default user data path is a sub directory of the base data path. You can select for this directory also the Windows Personal directory or input the path. The Windows guide lines prefer the Windows Personal directory. We prefer that the data path is a sub directory of the base data path. In this case users can read data from other users.

3.2 Software input sheet
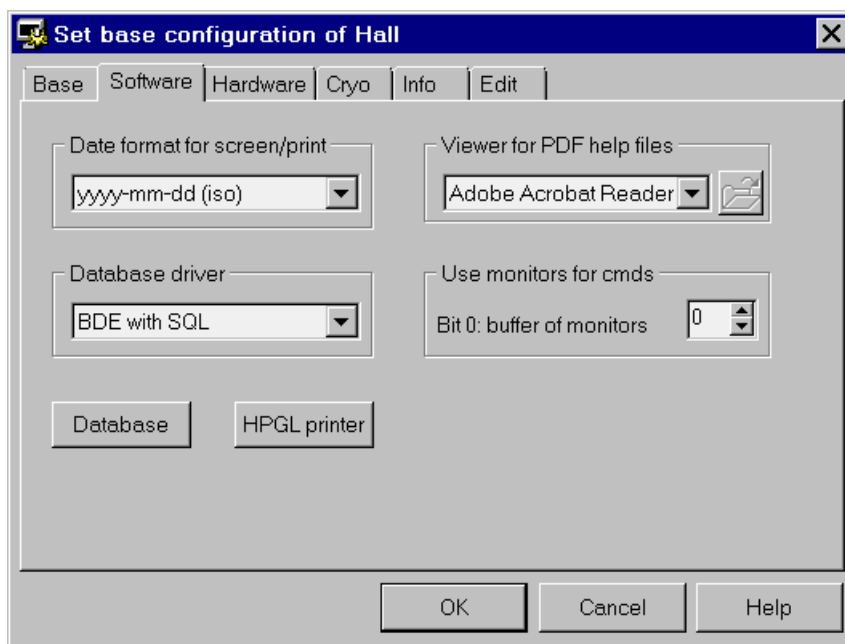
Here normally no changes are necessary. You can define the viewer for the help files, special options for a HPGL printer, the licence name when empty and the **date format**. As Windows means that the software shows the date as in Windows configured. This is only for showing the date not for the saving. The date will always be saved in ASCII files as yyyy-mm-dd. This is the ISO norm and will be used in this manual if showing the date.

You need a **PDF viewer** for showing help files by the F1-key or Help-button:

Adobe Acrobat Reader: The Adobe Acrobat Reader will be used. In most cases it is already installed on your PC.
Adobe Acrobat ActiveX: The ActiveX control of the Adobe Acrobat Reader will be used. In many cases it is already installed on your PC.
PDF viewer of browser: The PDF viewer of your browser will be used. Your browser need for this option an add-on (plug-in).
FoxitReader(Portable):   Use the FoxitReader or the FoxitReaderPortable. It is a small free software. You have to define the program name and path by the Open button.
SumatraPDF: For this freeware you have also to define name and path.

The reason for these 5 possibilities is that the help file should be opened at a specific page. The normal Windows call opens the first page. If the help file start with the first page, try another mode.
At the last 2 modes this reader will always be used for opening a PDF file from the Hall program, see chapter S2.5 of the Software Manual. In 'Help → Documentations' of the Hall program you can select a manual. At the first 3 modes here the standard PDF viewer will be used.

Use monitors for commands allow to start the program permanently in a **diagnose** mode. A small description will be given by its hint and in Sys\Doc\Diagnose.Txt.

Sometimes it can be helpful to change the **'database driver'**:

'Simple table' doesn't use any driver for the database but no SQL is possible. So you don't have all database options.
'BDE with SQL' is the standard driver, for this the BDE must be installed. Do not use it for the portable program.
ADO-ODBC with SQL' use the old Windows ADO drivers.
ADO-OLE with SQL' use the new Windows ADO drivers. These drivers are normally on the computer by the Windows installation. This is the standard input for the portable program. This mode should really the standard one for all installations. The advantage is that no drivers must be installed as for the BDE. But we don't know whether in future all Windows versions contain already the needful ADO drivers (MDAC).

The database button is only for database experts and opens the **extended database** configuration:
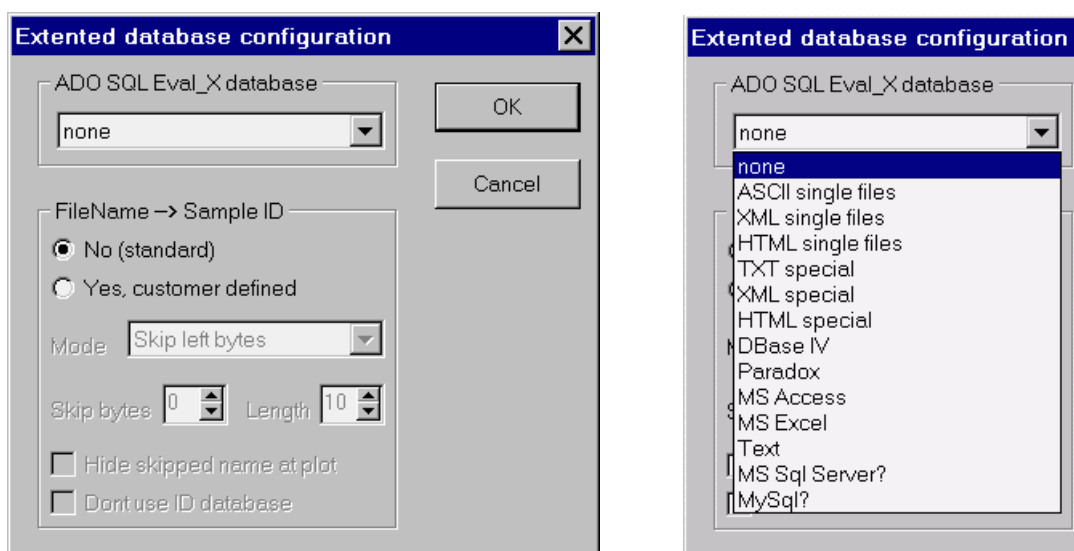
The **ADO SQL Eval_X database** means, that additional to standard evaluation database a customer definable database will be used. Every time when evaluation values will be stored in the standard evaluation database these values will be also stored in this Eval_X customer database. You find a small description in the file Doc\Eval_X.Txt, the configuration file is Sys\InitDat\Eval_X.Cfg. You can also write your own DLL, a description for the header of procedures is in Sys\Doc\Dll\CustBank.dpr.

At the input **File name → Sample ID** you can define if you want to create automatic the file name from the sample ID or the sample ID from the file name. The first one is the standard one. In the other case you have to define which part of file name will be used for the sample ID. The automatic creation is only an option, you have to select it in the main program in 'Params for database → Automatic file name'. There you get, if you have defied the case 'File name → Sample ID', the additional option 'Customer defined', see chapter S2.4.5 of the Software Manual.
By 'Don't use ID database' the database for ID's will not be used. If you create the ID from the file name it could be that you get for every file name an entry in the ID database. If this database will be too big, it could be helpful to work without this ID database. But then you can not search by the ID.

3.3 Hardware input sheet
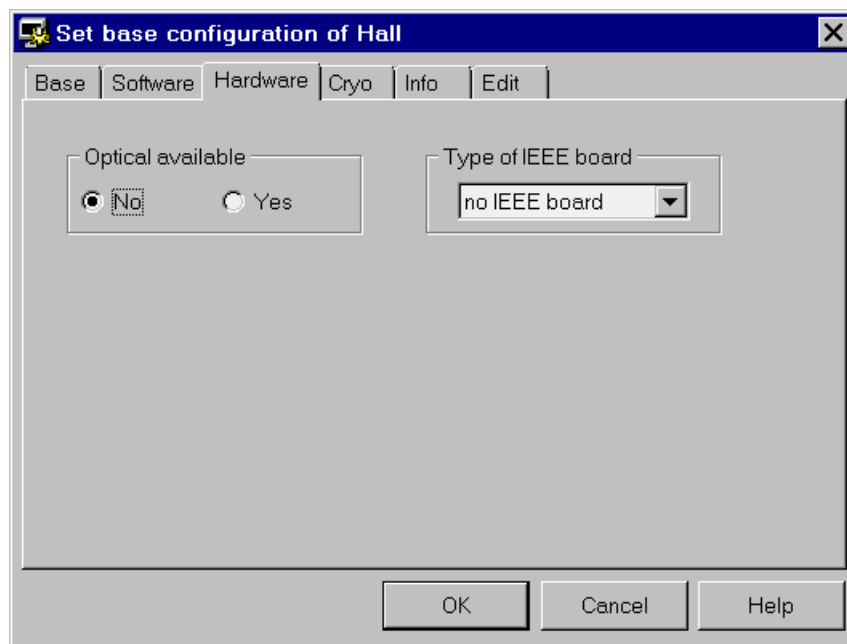
An **IEEE488/GPIB** interface/board is only necessary for the old RH 2010. For the RH 2035 and 2035 it is only necessary if your temperature controller need it. In this case select the type of your interface. The Keithley interface (PCI or USB) and the National Instruments interface (PCI or USB) will be supported. The Agilent IEEE interfaces can also be used by selecting the NI type. For this you have to activate 'Enable Agilent GPIB cards for 488 programs' in the Agilent Connection Expert. An USB to IEEE interface may not work at a not bus power hub.

Note: The new Keithley interfaces allow to install the Keithley (CEC) or NI (National Instruments) command compatible drivers. You must decide this at the IEEE driver installation, we recommend the NI compatible drivers. The type of IEEE interface must then be selected as the driver installation. Some possible problems will be described in chapter 6.2.

The optical interface is an option and it is not included in the standard system.

3.4 Cryo input sheet
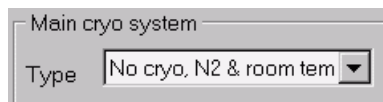
Normally the Hall systems comes **without a cryostat**. So the input for the type is:
 1) No cyro, room temp
 2) No cryo, N2 & room temp
 3) Internal Pt1000
The input depends on your sample stage.

You can also install a cryostat with a temperature controller. This installation, see at the right input sheet, will be explained below.
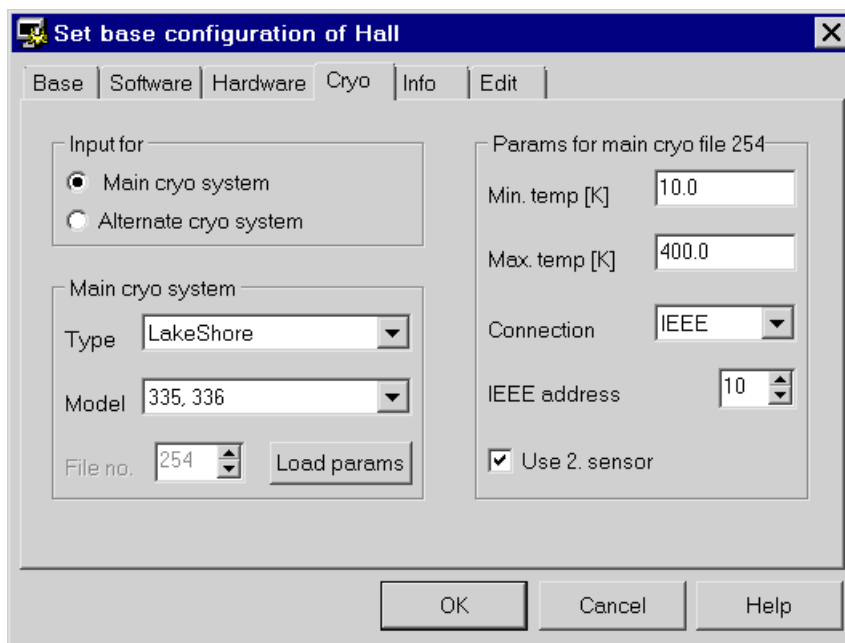
This input sheet allows the selection of an installed cryostat resp. temperature controller and its main parameters. Two cryosystems can be defined, the main and alternate one. During the program start, the user can then select which one he wants to works with.

'Type and model' gives a list of supported temperature controllers. Temperature controller not listed will not be supported in most cases, but normally we can create the drivers easily. You find a complete list of supported controllers in Hall\Sys\Doc\CryoFile.Txt and in chapter 7.5. If selecting 'Input of file number' as type, then you can input the cryo file number and the button 'Cryo list' is visible which lists CryoFile.Txt. This input allows the access to all supported controllers. Some controllers occur several times in the list because they have some options, for example different sensor inputs. If the input is marked by a 'simple' then only the base functions will be supported. Usually you should not use this type.

'Load Params' loads the main parameters of the selected cryo file and shows it on the right side.

Define the minimum and **maximum** temperature for your cryostat, these values limit the temperature inputs in the main program. But be careful because the cryostat can be damaged by too high temperatures.

Connection defines the connection between PC and temperature controller. Depending on your controller you can select between IEEE, COM (RS232) and network. When using the IEEE connection then check the IEEE address of the controller. For the RS232 connection you have to define the COM port on your PC.
Select COM as connection also when using a virtual com port by an USB to RS232 converter. Some controllers have an USB connection which will also be used as a virtual com port, for example the Lakeshore 335 or 336. You have to install a driver for the virtual com port. Check at the use of a virtual com port in the Windows device manager or in DevsList (chapter 3.7) which virtual com port will be used.
If you change the USB port of an USB to RS232 converter, another virtual com port will be defined! In this case you have to change the COM port number for the cryostat.

Tip: For the identification of a (virtual) COM port click onto the DevsList button on the Edit tab sheet (chapter 3.7). Expand then the tree 'Ports (COM & LPT)'.

When using the temperature controller in a LAN network then a config button will be visible under the connection input. This button opens a dialog for some **network parameters**.

The socket number is only an internal number used by the Hall program. You can not use 2 devices with the same socket number. Remind you of this fact when connecting other devices.

The network port specifies the port that is bound to the TCP socket connection. In many cases it is fix for your controller, so it is 7777 for the Lakeshore model 336. In some cases you can select a port number on the controller. Make sure that the port is opened in your network.

To identify the temperature controller in your network you have to input either its IP address or its host name. The network parameters and a use of an USB to LAN adapter will be explained a little more in chapter 4.2.
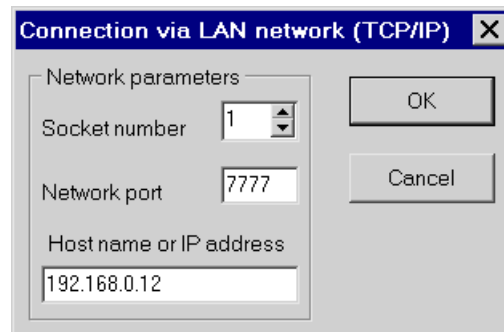
'Use 2. sensor' give the possibility to work with 2 temperature sensors, one for the temperature regulation, one for the measurement of the sample temperature. Only some controllers and cryostats support this feature.

More manual changes of the cryo file are possible at the Edit tab sheet, chapter 3.6.

3.5 Info tab sheet

This sheet gives information about the program version, paths, software options and drivers; the IEEE interface, if used, and the protection key will be tested, see chapter 4.1.

```
┌─ Set base configuration of Hall ──────────────────────────── ☒ ┐
│                                                                  │
│  Base │ Software │ Hardware │ Cryo │ Info │ Edit │               │
│                                                                  │
│   Version         ┌─ Program    : 4.0, 2013-07-02 ──────── ▼ ┐   │
│                                                                  │
│   Main pathes     ┌─ Program    : C:\PhysTech\Hall ───────── ▼ ┐ │
│                                                                  │
│   Software options ┌─ Expert            : yes ──────────── ▼ ┐   │
│                                                                  │
│   Hardware        ┌─ Driver exist ─────────────────────── ▼ ┐   │
│                                                                  │
│   Protection key  ┌─ Protection ID: 001-1101, 205E1CF7 measure ▲│
│                   │  ----------------------------------------    │
│   ┌ Refresh ┐     │  Licence = 1 for Weiss                       │
│   └─────────┘     │  Login   = measure                           │
│                   │  ------ Protection key okay ------        ▼  │
│                                                                  │
│                        ┌ OK ┐    ┌ Cancel ┐   ┌ Help ┐           │
└──────────────────────────────────────────────────────────────────┘
```
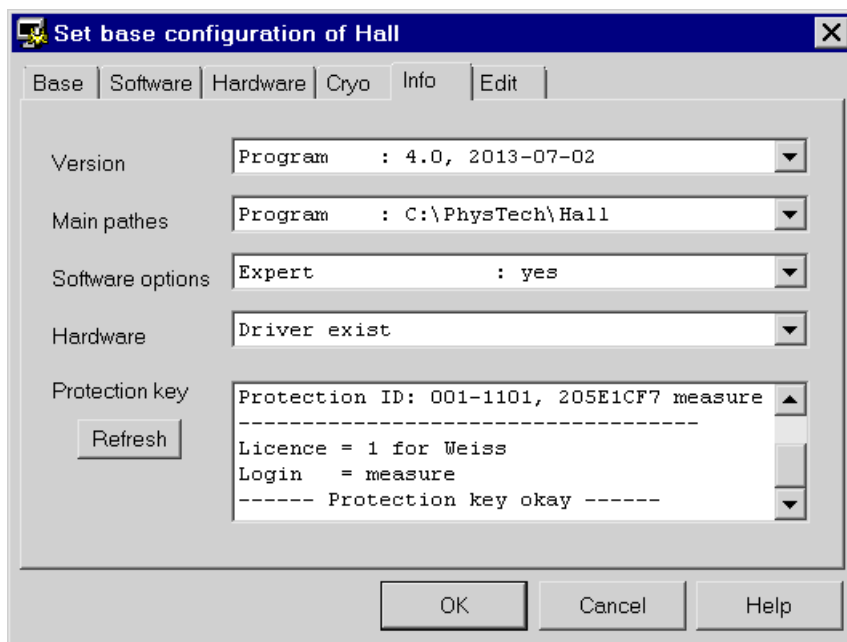
If the IEEE interface is used for cryostats etc. and has not been found, the interface has to be checked and / or the software drivers from the supplier have to be installed again. After the (re)installation it's absolute necessary to **reboot** Windows before any other configuration is done. The simulation and evaluation software will work without an IEEE board.

The old Hall hardware RH 2010 needs the IEEE interface, the Hall systems RH 2030 and RH 2035 use **USB**. In the last case you get an information whether the driver exist in the Windows driver directory. It may be necessary to connect the Hall electronic for identifying the driver, a reboot after driver installation may be also necessary.

Note: The left LED denotes that the power of the Hall system was switched on. The right LED illuminates after USB initialization by Windows (B series) resp. after transferring the firmware by the Hall program (A series). This LED of the A series lights also without the Hall power. For more details look in chapter 7.1.1 (B series) resp. 7.1.2 (A series).

The software will definitively not work if the **Protection** security key is not attached or not found. If the key was not found you get in the text field a short error description. The main errors A to D are similar as occur at program start. See chapter 7.6 for an explanation and how to solve the problem. Click onto the refresh button if you connect/disconnect the protection key. Sometimes a reboot of Windows solves the protection key problem.

We use 2 different kinds of protection keys: Hardlock and Sentinel keys. No driver is necessary for the Sentinel key because its driver comes since Windows 2000 with the operating system. The Hardlock key needs a special driver which will be installed by the installation program. If the hardlock key is still not found, go to the 'Edit' input sheet use 'Registry DLL', click there on the 'Tools' button and select 'External Hardlock Installation', see chapter 2.2. After rebooting the hardlock key should be found now or there is a hardware problem with the USB or parallel port of the computer.

The information will be searched automatically only at the first call of the 'Info' tab sheet. You can repeat manually the information search by the **Refresh** button.

3.6 Edit tab sheet

This sheet contains some tools for editing configuration files.
If you click at one of the following buttons, you get at some tools the question whether you want to apply the changes, which you here have done, into your main configuration file.
Some tools are separate programs and load again the configuration file.
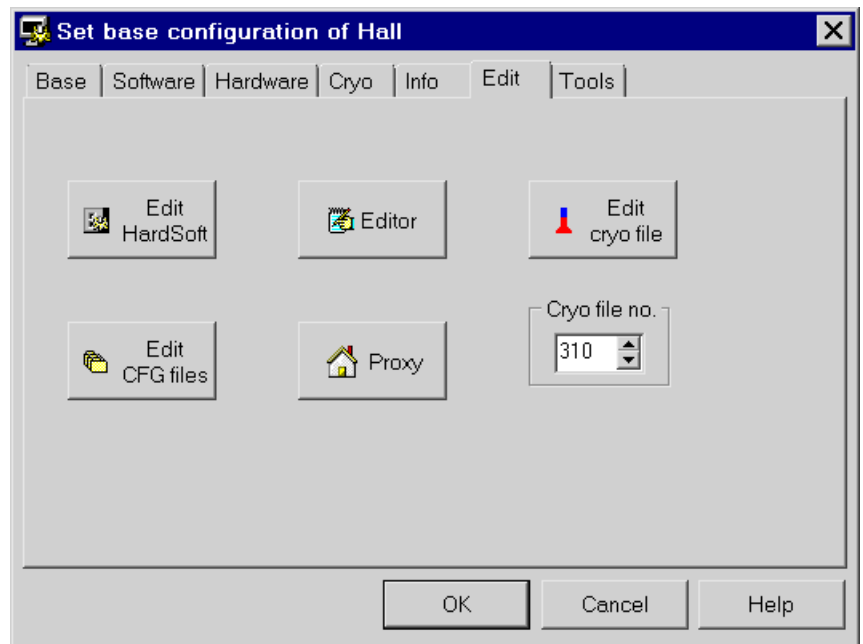
Edit HardSoft starts the editor with the main configuration file HardSoft.Cfg. This file is the most important configuration file. Be careful with changes in this file. You find an example file in chapter 7.6.

Edit CFG files selects a configuration file and starts then the ASCII editor with this file. You can select between List, Edit and Copy to Conf. Edit is only possible if this file exist in the customer directories Conf or Work. If it doesn't exist there select Copy to Conf and copy it, a new number for the destination file is normally possible. Then select Edit. Don't change CFG file manually without this editor!
If you create a new number, please use numbers 900 to 999 for the cryo system and 90 to 99 for the other measurement configuration files. These numbers will never be predefined by PhysTech. Numbers below 900 resp. 90 can be used in future by PhysTech, this can yield to some confusions because different meanings. But PhysTech don't overwrite files on the Conf directory at an update except at a new installation, see chapter 1.2. A file in Conf has always a higher priority as in Sys\Cryo or in Sys\Meas. This means, if a file with a given number will be found in Conf, then it will be load from there.

Editor starts the ASCII editor.

Proxy inputs are necessary if you use a proxy server for the internet connection.

Edit cryo file starts the ASCII editor with the selected cryo file by cryo file number. If this file exist in the customer directory Conf, the file will be loaded from here, in the other case it will be loaded from the original directory Sys\Cryo. If no file with the given number exist, you get a question for the number of an existing cryo file which will be copied as cryo file with the new number. So all default values of the new file come from this selected file. Please use only numbers 900 up to 999 when creating a new cryo file number, see arguments in 'Edit CFG files'.
Changes in a cryo file will always be saved into the directory Conf. If the file doesn't exist in Conf, it will here automatically be created when saving the changes.

3.7 Tools tab sheet

This sheet contains
optional tools for the
configuration and for the
trouble shooting.
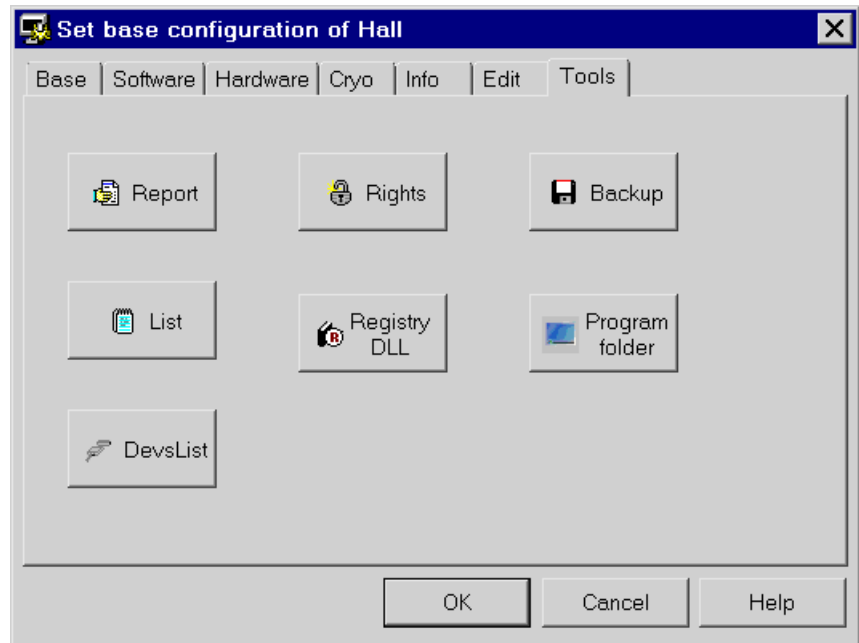
Report makes a report of your configuration. After this report attach the Report.Zip file to your eMail if you have questions to PhysTech about the configuration. PhysTech needs this file always to help you at trouble shooting. It is possible to start the Hall program for test during the report. This is only helpful, if you have start problems. Look in the text field for more information.

List lists the last start log file, documentation text (not the manuals) and report files.

Rights change the Windows access rights, see chapter 4.3.

Registry DLL starts the program 'Set registry and drivers', see in chapter 2.2.

Program folder creates a personal program folder for the Hall program and its tools, as shown in chapter 2.3, and creates a Hall icon on the desktop. In opposite to the Set_Reg program (see chapters 2.1 and 2.2) these will be done not for all Windows users but only for the current Windows user. Administrator rights here are not necessary. If you have created a common Hall program folder by Set_Reg (needs administrator rights), the creating of a personal folder is not necessary.

DevsList lists the devices, similar as the Windows device manager. Use this tool to find the devices resp. drivers if start problems occur. It is especially helpful to detect the number of a virtual COM port. In the following an example for the device list will be shown:

An IEEE (GPIB) interface is visible in an own tree, here it is the USB IEEE converter from Keithley.

2 virtual COM ports are in the tree 'Ports'.
COM4, labeled by 'Profilc USB-to-Serial Comm Port', comes from the USB to serial (RS232) converter which in this example will be used for the cryo system. Sou you have to set for this temperature controller as connection 'COM' and for the COM port '4'. Changing of the USB port yields to another port number!

COM 3, labeled by 'USB Serial Port', comes from the Hall system. It defines here the virtual COM port 3. But we don't use this port for the Hall system. The COM number is fix and will not be changed by another USB port.

In the tree 'Universal Serial Bus controllers' you see 'USB Serial converter' which comes from the Hall RH2030/2035 version B. If its driver is correctly installed, this entry must be visible.
Followings is here visible for the version A:

> ·Cypress EZ-USB (2131Q/2131S/2135S) - EEPROM missing

When using the blue USB Hardlock protection the entries 'Safenet Inc. Hardlock Key' and 'Safenet Inc. USB Key' must exist here.

When using the green Sentinel protection key you see in the tree 'Human Interface Devices' the entries 'HID-compliant device' and 'USB Human Interface Device'. But other devices can give here also such entries. So you must check whether the protection key gives additionally these entries.

An USB to LAN adapter is visible in the tree 'Network adapters' (ASIX ..).
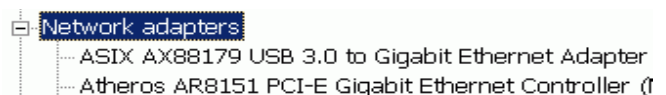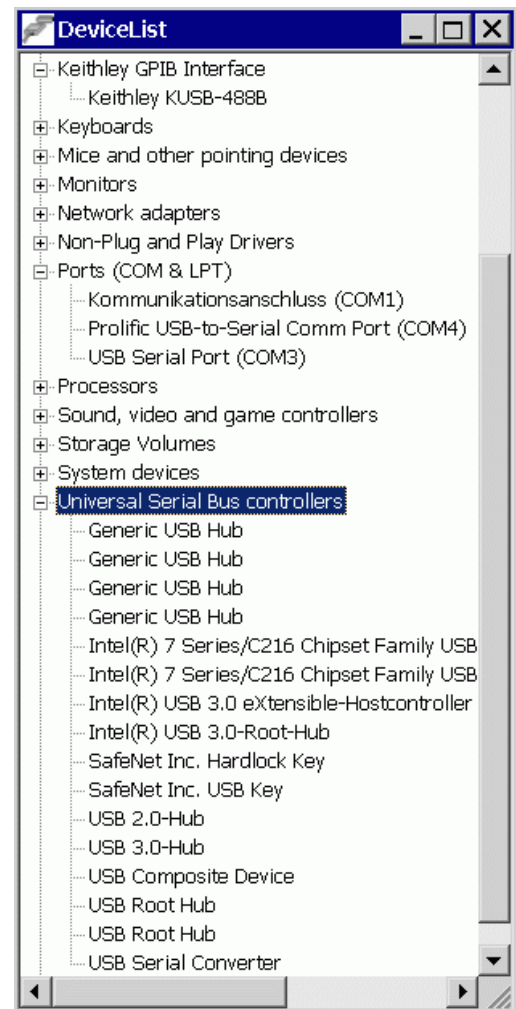
Tip: Additional drivers for a temperature controller, for an USB to RS232 converter or for an USB to LAN converter may be on your PhysTech CD.

The **Backup** tool makes a backup of your system configuration. The sub directories Conf and Work with all its files will be saved into another directory or packed into a ZIP file. If necessary then you can restore manually one or all files from this backup. This can be helpful at a new installation on a new computer, if the old installation or the old computer is broken. So the original configuration on the PhysTech CD can not know exactly the IEEE address of your temperature controller.
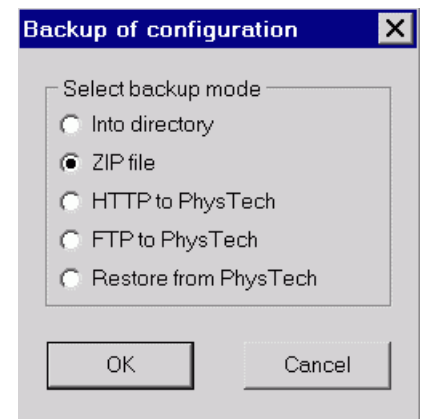
Don't overwrite the file Relay.Cfg on the directory Work by the backup file if it is not necessary. This file includes a report how often some relays were switched.

Following **possibilities** exist:

- **Into directory:** The sub directories Conf and Work will be saved into a selectable drive and directory. Use an external medium or a network drive!

- **ZIP file:** The sub directories Conf and Work will be packed into the ZIP file HlBakNNN.Zip where NNN is your licence number. This file will usually be saved into the directory Hall\Backup, the full name will be shown in an information box. Copy this file to an external medium or/and send it to support@phystech.de. When sending it to PhysTech, then PhysTech will save this file and can take into account the changes for the future.

- **HTTP to PhysTech:** Creates as above the ZIP file and send it via HTTP to the server of PhysTech.

- **FTP to PhysTech:** Creates as above the ZIP file and send it via FTP to the server of PhysTech. FTP must be available on your computer.

- **Restore from PhysTech:** Loads your saved ZIP file from the server of PhysTech, copies it to Hall\Backup and unpacks it. The configuration backup files then are in Hall\Backup\Conf and Hall\Backup\Work and in all its sub directories. Restore manually one or all files from this backup if necessary.

The last 3 possibilities exist only for the measure program and when the measurement protection key was found.

4. Further installation information

4.1 Drivers, DDL's and registry

The Hall program need usually some drivers in the Windows system directory.

If necessary, following **drivers** will be automatically installed by the **Hall** program:

- **FTDI:** This driver is necessary for the USB communication between computer and RH2030/2035 version B. It will not be used for the simulation and the lite program.
- **EzUsb:** This driver is necessary for the USB communication between computer and RH2030/2035 version A. It will not be used for the simulation and the lite program.
- **Hardlock:** This driver is necessary for the blue protection key (Hardlock). It will not be used for the lite program and when using the green protection key (Sentinel).
- **BDE:** This driver is necessary for using the database and library by the BDE. The BDE may be used for showing data of the database and library. It is not necessary for saving data into the database at the measurements. This driver will not be used when selecting 'ADO' or 'Simple table' for the database, see chapter 3.2.
- **OCX:** These files will be installed together with the BDE. OCX files are used only for some special tools in the plot program.

The measurement program may use following **additional drivers**, which have manually to be installed:

- **IEEE:** An IEEE interface (Keithley or NI) is necessary for the RH2010. It may be necessary for a temperature controller.
- **USBtoRS232:** This converter is necessary to connect a temperature controller with a RS232 to the USB port of the computer (virtual COM port). Such a driver is also necessary for a temperature controller which has an USB connector but uses it as a virtual com port, for example the Lakeshore 335 and 336. A separate driver installation is not necessary for a converter with the FTDI chip when using the RH2030/2035 version B.
- **USBtoLan:** This adapter may be necessary for a temperature controller with a network connection when no free network connector of the computer exist or it should not be used. The driver for the external adapter may come already with Windows.

The drivers need some entries in the Windows **registry**. These will be done by the Hall program and by the external installation programs. The Hall program itself saves only the program path in the registry. This is helpful to find the installation path at an update. But this entry is not necessary.

All DLL's of the Hall program are in the Hall program directory 'PhysTech\Hall\Bin'. Therefore different program **versions** can be saved on the computer, for example in 'C:\PhysTech\HallOld'. All these versions can be used without version conflicts. Each program version has its own directory for the user initialization files. Only if the data structure of the measurement data files was changed, then you can load these data only by programs with same or higher version number.

Information about installed drivers will be given in the report file, by DevsList (chapter 3.7) and on the 'Info' tab sheet. 'Hardware' lists here the version of the FTDI USB or EzUsb driver and checks a selected IEEE board. Both will only be done for the measurement program and if this hardware will be used. When using the blue protection key, then 'Version' lists the version of the hardlock driver. The date of the Windows HID driver will here be listed for the green Sentinel protection key. The installation and version of BDE and OCX will be listed even when not using these.

The installation of BDE will be checked at starting the Set_Conf program, an IEEE board will be checked at leaving this program. Following warnings may occur:

BDE not installed: It could be that you get this message before automatic start of the SetUp Configuration (start from installation program in installation mode).
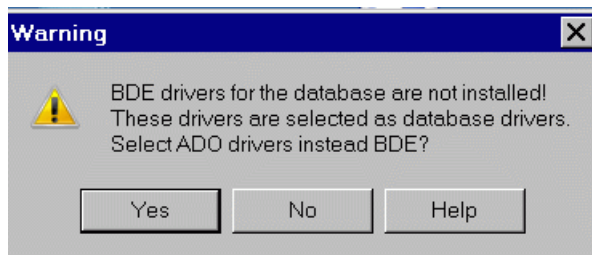
It means that the BDE drivers for the database were not installed but these drivers are selected as database drivers. The program ask you for switching to the ADO drivers which should be already installed, see chapter 3.2.

IEEE board not installed: If you have selected an IEEE board but it was not found you get the following input window:
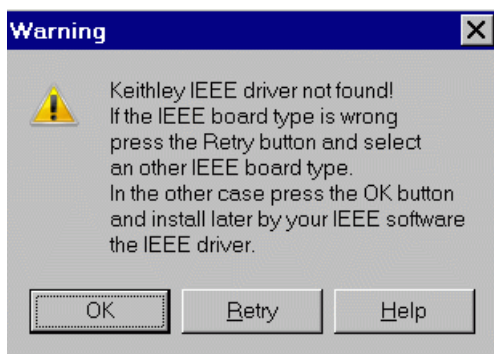
With 'OK' you leave the program with the selected IEEE board. By 'Retry' you get again the hardware tab sheet, so that you can select another IEEE board.

'**Please reboot**' occurs at the end of the installation when a new driver was installed:
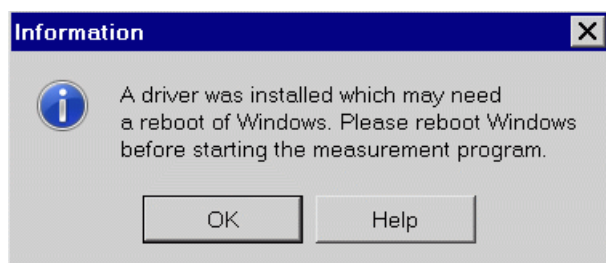
Depending on the driver, operating system and CPU a reboot may be necessary. Without rebooting errors are possible, especially for the communication with the measurement system. The information given on the 'Info' tab sheet (chapter 3.5) may be wrong. So we recommend to reboot Windows.

4.2 Network devices

Some external devices can be connected via LAN network with the computer. The input of the network port and of the IP address or host name of the device are necessary. In the following a temperature controller (see chapter 3.4) will be taken as example of a device.

The **socket number** is only an internal number used by the Hall program. You can not use 2 devices with the same socket number.

To identify the device (temperature controller) in your network you have to input either its **IP address** or its **host name**. A host name is a name that is assigned to a device in a network name. A Domain name system (DNS) must be available for using a host name instead of the IP address. This can be done automatically by a DCHP server. It may take some time until the IP address will be valid. So wait a little bit after turning the controller on or connecting the cable. The controller is not ready for working in a network until it has a valid IP address. Usually you can see the IP address and the host name on the display of your temperature controller. For more details looks look in the manual of your temperature controller. You might need to enable DCHP on your controller. Contact your network administrator for help in establishing communication with the LAN interface.

It can be helpful or necessary to use a separate **USB to LAN adapter**. Often the network administrator forbids the connecting of an external device to the company network. Use here such an USB to network adapter, which creates a new separate network. It may be that you must here take the mDNS host name instead of the DNS host name, especially when a network already exist. Sometimes the mDNS name includes the DNS name with appending of '.local'. The use of the IP address is furthermore possible. Especially at a USB to LAN adapter it can take some time until the IP address and host name is valid. The installation of a special driver for the adapter is often necessary, sometimes it is already included in Windows.

The **network port** specifies the port that is bound to the TCP socket connection. In many cases it is fix for your device. Make sure that the port is opened in your network. Ask your administrator for details. Usually it should be opened, but this depends on your network and firewall.

In many cases the desired port may not be opened in a company network. There you should not use the company network but a separate USB to LAN adapter. If there this port is also not opened, you have to open it manually.

On the next pages it will be shown how to change the type of network, to set manually the IP address and to **open manually** a network port. Do it only if the port which you need is not opened. First you should check whether your network type is 'home' or 'work', it should not be 'public', if possible. Perhaps a change to 'home' opens your desired port. But usually Windows forbids the change of network type for an external USB to LAN adapter. When there is more than 1 network, identify the network type which belongs to your external adapter. For this open the Network and Sharing center, disconnect and connect again the adapter.
It depends on your firewall and operating system how to open a LAN port. The next pages describe it for Windows 7.

First call the Windows Control panel and there the '**Network and Sharing Center**'.

You can change the **network type** by clicking onto the blue caption 'Work network'. Then you get a dialog where you can select 'Home' (Private), 'Work' or 'Public' network. Select here 'Home'. But often Windows forbids the change of network type for an external adapter, here it is 'LAN-Verbindung 2'.

Run then the Hall program and check whether the desired port is opened. If the program don't work, you have manually to open the port.
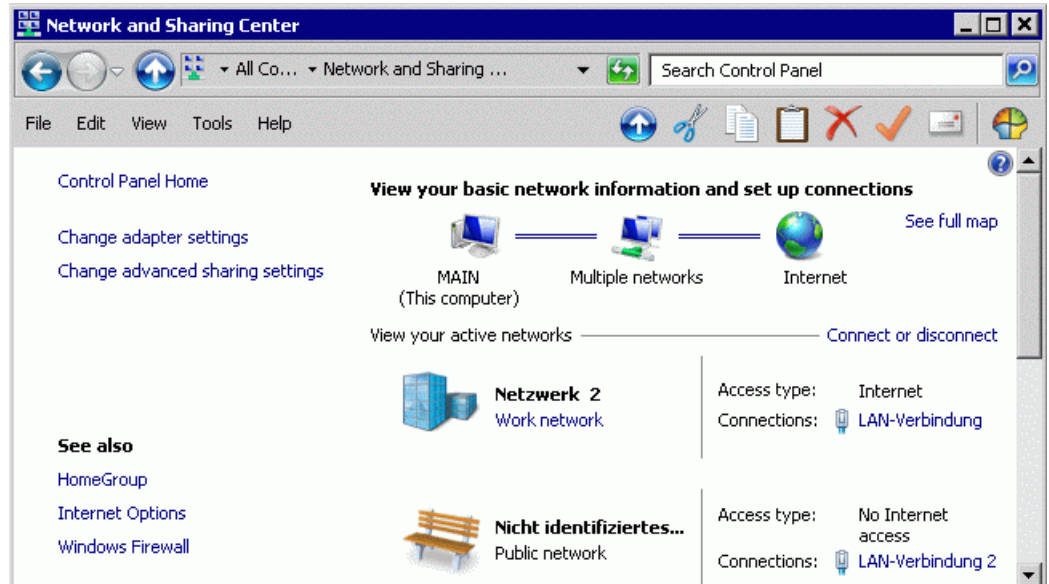
For setting manually the **IP address** (usually not necessary), click on 'LAN-Verbindung 2' and then on 'Properties' of the next window. A new input window opens as shown on the right. Mark there 'Internet Protocol version 4' and click onto the 'Properties' button. In the next dialog you can define the IP address, for example 192.168.2.1, as how on the bottom. Select as mask 255.255.255.0. The other fields can be empty.
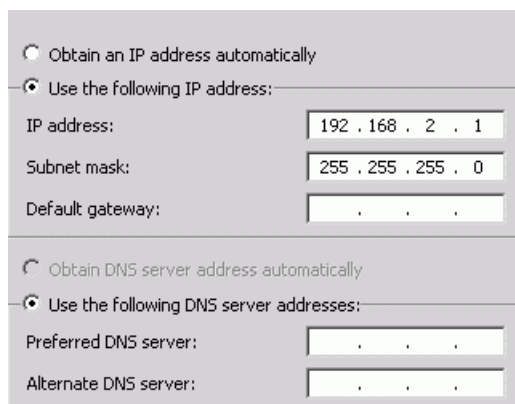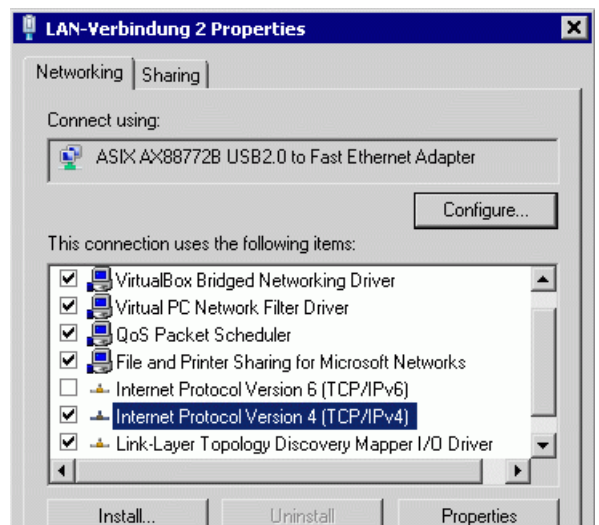
Start the Windows **Firewall** for a manual opening of a port. You find the firewall in the Windows Control Panel.

Click in the Firewall on the Advanced Settings.
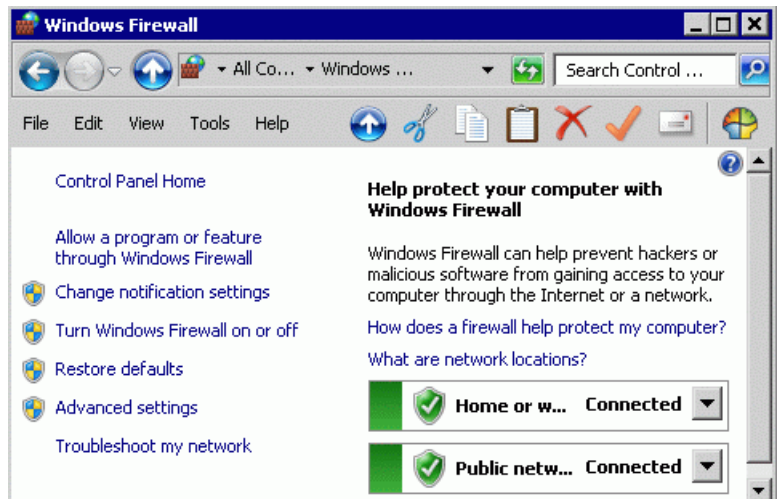
At the Advanced Settings click first onto '**Inbound Rules**' on the left side. Then click onto 'New Rule' on the right side. A new dialog for the rule type will open as shown on the next page.
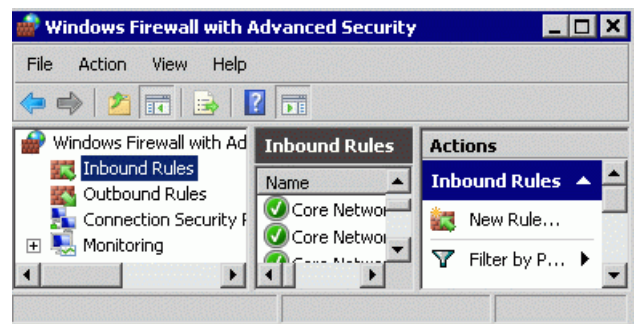
5 dialogs for the new rule exist.

Select as rule type (first dialog) 'Port' and go on by the Next button.
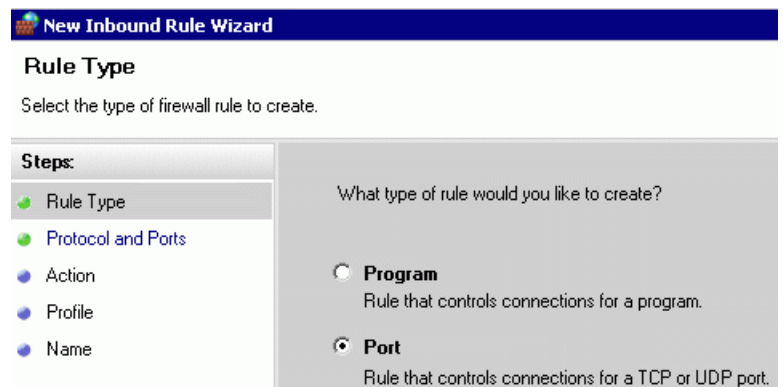
Select in dialog 2 'TCP' and 'Specific local ports'.
Input the desired port number(s). In this example these are 5025 and 7777.
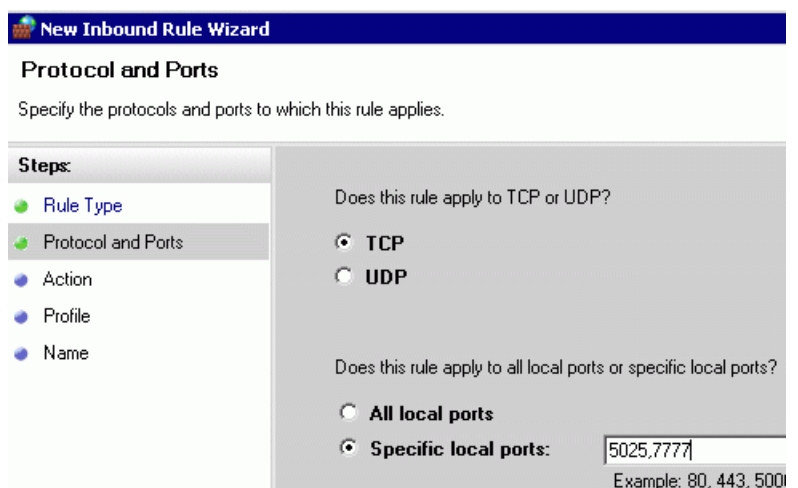
As 'Action' (dialog 3) select 'Allow the connection'.
As 'Profile' (dialog 4) select 'Private' for a home or work network.
Dialog 5 expects a name for the new rule.

If you have finished the new inbound rule, you have to define the same for a new outbound rule. For this click onto '**Outbound Rules**' on the left side of the Advanced Settings of the firewall, see last picture of the previous page. Then click onto 'New Rule' on the right side. You get the same 5 dialogs as for the inbound rule, type in there the same settings.

4.3 Windows access rights

Here you can change the access rights of the Windows operating system. This can be necessary if you work normally without administrator rights and more than one user is working on Hall. For theses changes you need administrator rights. Change the rights only if you have experience with this.

3 possibilities for **'Allow file access'** exist:

1. The first possibility changes the access rights only for these directories, which will be commonly used by different users, these are the data directories and the work directory. So administrator rights are necessary to change, if existing, default init files in Conf\Init valid for all users, for example for the material parameters.

2. At the second possibility (Data, work and conf directories) additionally the rights for the customer configuration directory will be set. In this case you need no administrator rights when changing your configuration, every user can do this.

3. With the third possibility the access rights of the total PhysTech directory will be set so that all users can make changes there. For updating you need then only administrator rights if new Windows driver will be installed.
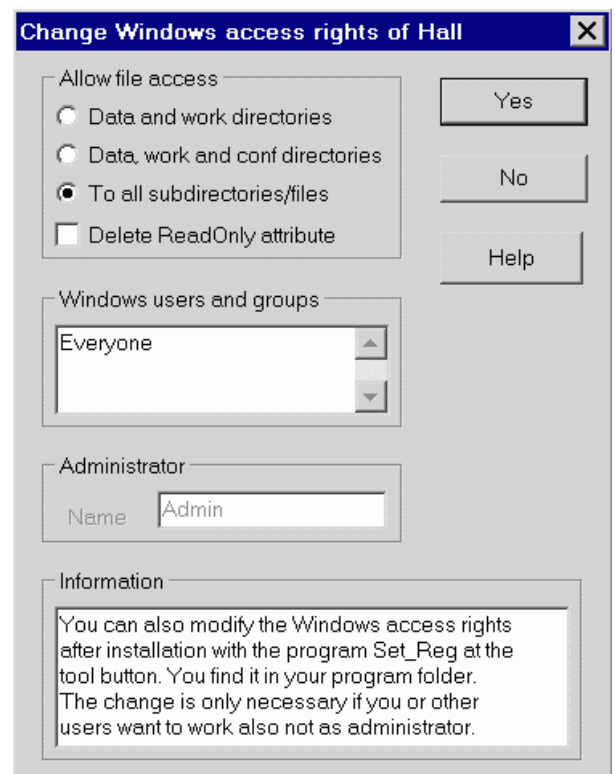
'Delete ReadOnly attribute' is normally not necessary.

In **'Windows users and groups'** you define which groups and users get full access to the Hall directories specified above. The normal one is for the group 'everyone'. This name is Windows language specific.

Depending on the mode for the base data directory explained in 1.4 and 3.1.2 full access rights (read/save/modify) for every user is necessary at the following directories and all sub directories. Mode 1 is the standard one, mode 2 for the Windows common directory:

1) PhysTech - Hall - Work
                  - Diag
           - HallData

2) CommonFiles\PhysTech

5. Update and other programs

5.1 Quick update guide

This chapter describes shortly how to update the Hall program, a detailed description will be given in the next chapter.

For updating run the update program '**Load update files**', you find in your Hall program folder under Tools. Then an input window opens as shown in the next chapter.

The best way for updating depends whether you have an internet connection on your PC.

Updating with internet connection on your PC:

Call the update program and select 'Standard update/bugfix from internet' as '*Update main mode*'. Then click onto the 'OK' button and confirm all default inputs.

Updating without internet connection on your PC:

● Use a PC with internet connection and call www.phystech.de from your browser. Select there 'Downloads → Download of Hall program for Windows'. Download there the full program package 'Hl_Inst.Exe' or the bugfix package 'HlXX_Fix.Zip' (if possible).
● Copy this file to an USB stick, go to your measurement computer and copy the file to the PC. Use the default directory C:\PhysTech\Hall\Sys\Install\Zip.
● Call the update program and select 'Input of package mode' as '*Update main mode*'. Select 'From directory' as '*Package from*'. Select the package 'Full program package (update)' or 'Bugfix packge (bugfix)'. Input the name resp. the directory where the package is saved, usually it should be the default directory.
● Click onto the 'OK' button and confirm all default inputs.

Note: Don't make an update by unpacking the package and copying the files manually! Use always the update program for updating.

5.2 Update program

If a Hall version is already installed on the computer, it is possible to perform an update instead of a complete installation. In this case all customer system files in 'Conf' will not be overwritten. Personal init files will be deleted only if a new version of these init files exist. Data files will never be overwritten.
**Do not make any manual changes in 'Bin' and 'Sys'.** At the next update these changes will be overwritten. Changes are only in 'Conf' allowed. Use for these the Set_Conf program, see chapter 3.

Tip: From time to time you should check whether a new version exist at PhysTech homepage. You can make this check with the following update program and with the main program in the menu 'Help --> Load version info from Web'. For an automatic **information about new updates** send an eMail to info@phystech.de with subject 'update info'. Please write in this mail your name, eMail address and licence number.

For updating there is a special program tool, you find in your Hall program folder under Tools, called '**Load update files**'. Another way is to run 'Update.exe' directly from PhysTech\Hall\Bin\Update.exe.

Administrator rights are not necessary for the installation of a package, except you have installed the Hall program in the Windows program directory. If not everyone may change the Hall directories, use Set_Reg to change the rights as described in chapter 4.3.

Don't unpack a package **manually** and don't copy manually the files of a package!
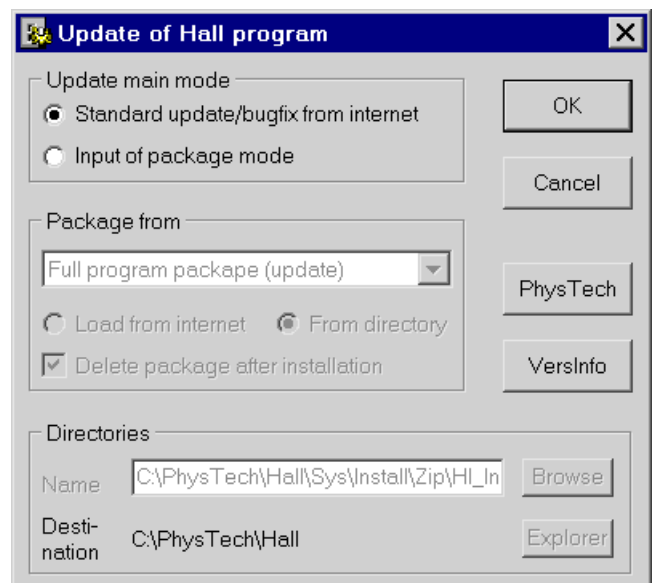
The default input for the 'update main mode' is '**Standard update/bugfix from internet**'. In this case the program makes an internet connection to the PhysTech homepage and check if a new version, update or bugfix, exist. You get then an information about your installed version and the version on PhysTech homepage, similar to the information when clicking onto the 'VersInfo' button. If a newer version exist, you can start the download and update. The optional package will also be downloaded if necessary.
If you use a **proxy server**, it could be that the download doesn't work. In this case call the program Set_Conf, go to tab sheet 'Edit', click there on the 'Proxy' button and input the proxy parameters. Another possibility is to load the package manually with your browser and install then from hard disk, see below.

By '**Package from**' you can define the kind of package and where it come from:
- **Load from internet:** Loads the selected program package automatically from internet.
- **From directory:** Loads it from a directory. You have to define the source file name (update package) or the source directory (bugfix package). So you can download the package manually from www.phystech.de and install then the saved file.

The manual download is only necessary if you have no internet connection on the PC where the Hall program is installed. No files or information will be send to PhysTech at the automatic update! Only files will be downloaded.

There are up to 4 different packages:

- **Full program package (update):** Here a complete update will be made. All system files will be copied, except the customer system configuration. After unzipping files the program starts the installation program with mode 'Update'. For further information see chapter 1.1. You can use the update mode if you have already a program version on your computer. Your version number can be smaller or the same as the new one. The program package has the name Hl_Inst.Exe. This package includes also all bugfixes. The SetUp configuration program will be called after an update. If you leave this then you get a question to show a list of the main new features. The file 'HlAdd_Version.Pdf' contains this list. You find it in your documentation directory Sys\Doc.

- **Bugfix package (bugfix):** This bugfix package is not only a bugfix, it is also a service package to your installed version. Only the new and debugged program files will be installed but no new drivers. The bugfix package is version specific, that means for the latest bugfix of version 3.2 you must have installed already version 3.2. The bugfix package has the name HlXX_Fix.Zip, where XX is the program version.

- **Optional package:** All important drivers are in the full program (update) package. Some additional drivers, tools (so the external installation program for the hardlock key) and documentations exist for checking problems. You get these files with your CD. It could be that newer ones exist, so you can load it here. Normally these files are not necessary. The name of the optional package is Hl_Opti.Zip.

- **Customer package:** This special package exist only in special cases, you get an information from PhysTech if you have to install it.

The **'PhysTech'** button calls our homepage www.PhysTech.de.

With the **'VersInfo'** button you get an information about your installed version and the download version at PhysTech homepage. In this manual the date will be shown by ISO norm as yyyy-mm-dd.
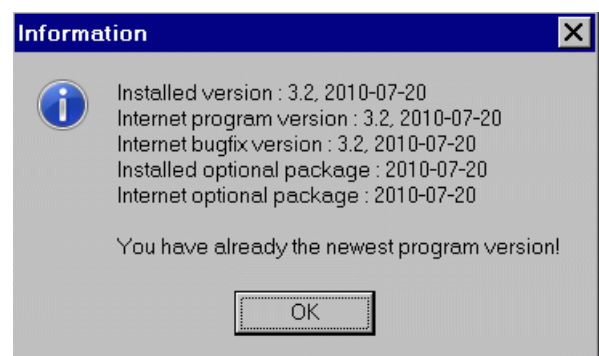
Note: The full program version will be defined by the version number and the version date. All files of same version number but different dates are compatible. Different versions resp. bugfix/service packages of different dates can exist for a version number. The latest bugfix include all changes of bugfixes before. The full program package contains always the latest bugfix, so it is not necessary to load update and bugfix.

Caution: Do not mix manually files of different versions, especially the HardSoft.Cfg!

If selecting the full program package (**update**), first the package will be unzipped and the files copies to a temporary directory. Then the updated installation program starts similar as described in chapter 1, but with the installation mode 'Update', see picture below.
All program files will be installed newly except the customer system files. All user definable files (personal init files) are left unchanged if possible.

At selecting update you see a check box 'Save old version'. You should use this option if you have not saved your old version. The old version will be copied to the sub directory HallOld. If you want to start the old version, go by the explorer to the direc-tory HallOld\Bin and start there Hall. Or start it by 'Tools\HallOld' from your Hall program folder.
You can have different versions on your PC.

Administrator rights are usually not necessary for the installation of the update package, except you have installed the Hall program into the Windows program directory. If not everyone may change the Hall directories, use Set_Reg to change the rights as described in chapter 4.3 (possibility 3).
If the check box '*I have or get administrator rights*' is activated, the program Set_Reg will be started after copying the files, see chapter 2.1. Then the existing drivers will be checked and may be replaced by newer drivers. This option needs administrator rights. Use this option if you have administrator rights.
No new drivers will be installed when this check box is deactivated, the Set_Reg program will not be called. If the program runs fine, there is no reason to replace the drivers by newer ones.

Note: The Update program calls for an update the Install (and the Set_Reg) program. If higher Windows access rights are necessary, this program may not automatically be shown on the desktop, only a program icon may be visible in the task bar. Click then on this icon to activate the program.

5.3 Licence program

For installing a new licence package/file use the program Set_Lic, you find in your Hall program folder under Tools.
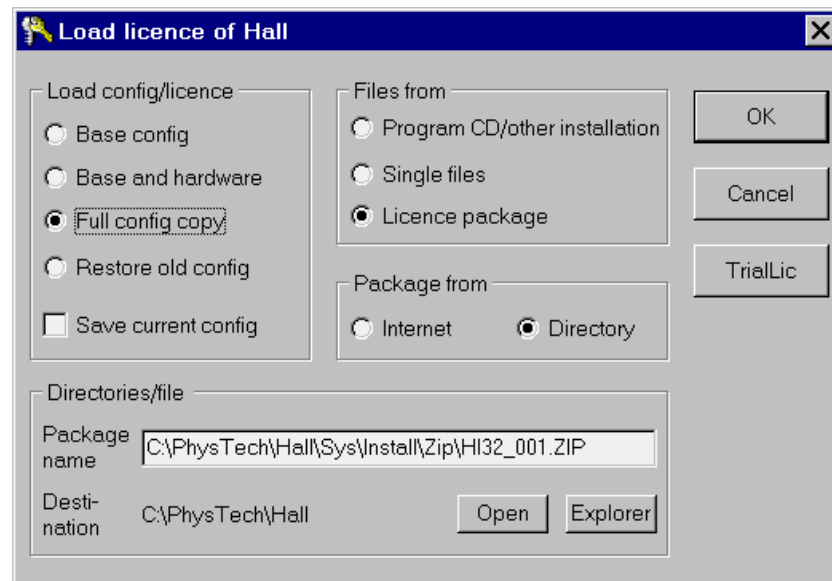
There are 4 possibilities for **Load/config licence.** In all cases the licence file will be copied. The difference is only in changing the HardSoft.Cfg file:

1. **Base config:** Only the base configuration will be changed, lines 90 to 129 of the HardSoft.Cfg.
2. **Base and hardware:** The base configuration and the parameters for the hardware will be changed, lines 90 to 199 of the HardSoft.Cfg. Use load mode 1 or 2 if an installation already was done and you want to keep your parameters. That is the normal case.
3. **Full config copy:** A new HardSoft.Cfg will be copied. If you have no licence file installed you must select this mode. It is only possible if the licence package have the same version number as the running program. The program checks the HardSoft of the licence package. In the other case the load mode 'Base and hardware' will be used.
4. **Restore old config:** Only possible if you have already saved an old configuration.

Normally you use not only the single files but the **licence package** which contains all relevant files. These are the licence file System.Bin, the main configuration file HardSoft.CFG and the customer file Customer.Cfg. The customer file is not necessary for installation. The licence package have the name HIXX_NNN.Zip, where XX is the licence version number and NNN is your licence number, for example HI32_001.Zip for licence version 3.2 and licence number 1. You find your licence package on the root directory of your CD or in the installation of your PC in the directory Hall\Sys\Install\Zip, or you get it from PhysTech by eMail.

Tip: If you have installed the wrong licence call this licence program. Select load mode 1 if you have already changed the hardware parameters, in the other case mode 3. Use your licence package from your original CD or ask PhysTech for the licence package.

5.4 Portable (lite) program

The portable lite program runs on a USB stick without hardware protection key and without special drivers. The easiest way to install it is to call from your Hall program folder the tool 'Install portable lite program'. Use for this call the PC where you have installed your measurement program, not a simulation or lite program. Plug in the USB stick into a USB port on this computer. You can call also from this PC the installation program and set manually the mode to 'portable lite program'.

The installation program creates on the root directory of the USB stick the program link 'Hall.Bat' which starts the Hall program. No administrator rights are necessary for the installation of the portable program.

For the first start you need the protection key for measurement. So call your portable program first time from your measurement computer. The lite licence will be automatically generated after start. The lite licence file is 400 days valid. After this time you have to refresh your lite licence by your measurement protection key. Use for refreshing your measurement PC. You can refresh every time your lite licence in 'Base tools → Utils'. After an updating to a new version number is a refresh of the lite licence file necessary. The installation of the bugfix package needs no refresh of the licence.

The portable program runs only on the installed medium (USB stick or harddisk)! So it is not possible to copy it to another stick.

The portable program writes temporary files and usually configuration files to its medium. Some computer forbid to save any file to an USB stick, that means that the stick has a **Write protection.**

The program detects this case and opens the following input window.

If it possible to clear the write protection and to change the access rights do this and start the portable program again.

If this is not possible then you have to use a temporary and/or your personal directory on the computer.

2 possibilities exist for using the temporary resp. **personal directory**:

- **Use only for temporary files:** The temporary directory on your computer will be used for saving temporary files. These files will be deleted at program end.
  Advantage: Your init (configuration) files will be read from the stick.
  Disadvantage: Saving of configuration and data files are not possible.
  Application: Use this mode if only reading data files but not saving.

- **Use also for init and data files:** Your personal directory on the computer will be used for temporary, init and data files. The program creates here sub directories for the init and data files and keep these files.
  Advantage: Your configuration and new data files can be saved on the computer.
  Disadvantage: You standard configuration will not be read from the stick.
  Application: Use this mode if creating new data files by simulation or evaluation.
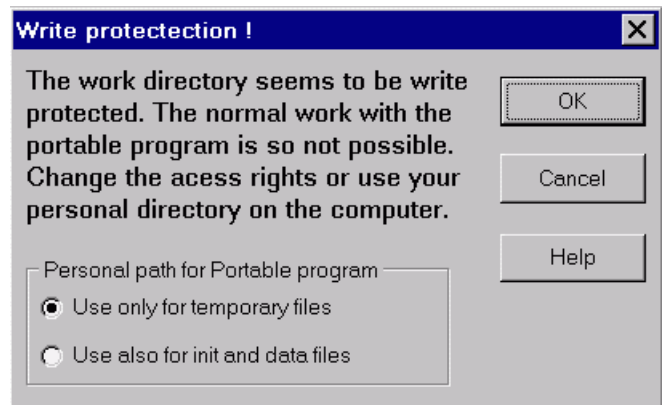
3 similar types of **lite programs** exist (see also chapter 1.2):

- **'Lite program, no key':** It is for a fix installation but working without a protection key. When your protection key is a hardlock key then the driver for the hardlock key will be installed on this PC because these are necessary for the first run of the lite program. The drivers for the BDE and OCX files will also be installed on the PC by default, a program folder and icon will be created.

- **'Lite program, portable':** It is designed for USB sticks, see above. No driver or other files will be saved in the Windows directories, in the Windows personal directory or in the registry. ADO, which is usually on your PC, will be used for the database instead of the BDE. The mode for the base data directory is 'main program directory', see chapter 1.3.

- **'Lite program, server':** It is similar to the portable program but it is designed for a server. Install this program into a server directory. No drivers will be installed on the server. Only the driver for the hardlock key will be installed on that client PC from which the installation will be done. Connect the measurement hardlock key to this PC at the first program start. If necessary, after 400 days, refresh your lite licence from this PC. You can run the server lite program from every client.

5.5 Demo program

You can download the demo program Hl_Demo.Exe from our homepage. Store this file in a directory, for example C:\Hall_Ins, and run there this program. It is a self-extracting Zip-file. You get there an input window for confirming to unpack the files. After unpacking call the program Install.Exe as described above. After installation you get questions for making your CusDemo.Txt file. This file is in Hall\Work. Send this file to PhysTech. Then you get your demo licence file SysDemo.Bin by eMail. Copy it to Hall\Work. The demo licence is normally 100 days valid, you need an internet connection for running the demo program. The demo program package don't contain all program tools as the full program.

5.6 Removal to a new computer

If you want to move the software to a new PC, you may make a complete new installation or copy the old installation. In the first case you can install the program from your CD or from the newest internet program package as described in chapter 1.5. The disadvantage of this method is that you lose your old configuration settings. The old data directories must be copied separately.
An easier way is to copy the total PhysTech directory to an USB stick. Then copy this directory to your new computer. Run then from the Hall\Bin directory the program Set_Reg as described in chapter 2.2. Activate there the flags for installation of drivers and BDE and for creating the program folder and icon. If you had an old program version on your old PC, run the program Update (described in chapter 5.3) from the Dlts\Bin directory of the new PC after copying the files. A separate call of the Set_Reg program is here not necessary because this program starts automatically by updating.
The copy method is only possible if you have made on your old computer a standard installation for the base data directory, see chapter 1.3, that means that PhysTech\Hall is the main program directory.
An **IEEE** board or an USB to **RS232** converter has to be installed separately, the address of a virtual COM port has to be checked.

6. Trouble shooting

6.1 Connecting USB hardware

The RH 2030/2035 uses the USB port. Version A has another USB interface/ driver as version B. Therefor the USB installation procedure is different.

6.1.1 USB connecting for RH 2030/2035 version B

The RH 2030/2035 version B works under 32 Bit and 64 Bit Windows. Don't connect the USB cable to the measure system before complete software installation! You should reboot after driver installation.

If you connect it first times, you get from the Windows operating system the message that a new driver was installed. In the information window there is the hint that a COM port was installed, it is visible also in the device manager. We don't use this virtual COM port. The COM number is fix and will not be changed by another USB port.

The **LED** near the USB connector on the Hall system illuminates when Windows has loaded and initialized the software driver for the Hall USB interface. For this it is necessary that the hall system is switched on.
The LED on the left side denotes the **power** of the Hall system. If power is not on, then the Hall program breaks with an USB error. In this case switch on the measure system and repeat the initialization, take care that the USB LED illuminates.
It may be that the USB LED light goes out by switching on or off the Hall electronic. Usually it illuminates again after 2 seconds. In the other case disconnect and connect again the USB port. Start the Hall program or repeat the initialization not before this LED illuminates.

Tips:

a) If an **USB initialization** problem occurs at program start, try followings in this order:
- Check whether the power of the Hall system is switched on.
- Disconnect and connect the USB port again.
- Reboot your PC.
- Try another USB port.
- Work without an USB hub or work with a powered USB hub.
- Call the external FTDI installation program, see chapter 2.2.

After new connecting of an USB port **wait** a little bit.

b) The **LED** near the USB connector on the Hall electronic illuminates when Windows has loaded and initialized the software driver for the Hall USB interface. If it don't illuminate, unplug the USB connector and plug in again the USB connector.

c) The base installation of the **drivers** (registration) resp. the copying into the Windows directory will be done by the program installation. Sometimes it can be necessary to make this base installation again, see chapter 2.2.

d) Look in the **DevsList** under USB controllers whether there is 'USB Serial Converter', see chapter 3.7.

e) If you get start or hardware problems, the program breaks with an error message and asks you for making a **report** file. Please send it to PhysTech if you have questions to us.

In the following the main possible **USB problem** will be explained which can yield to an error message at program start:

The **start error 801** (USB init) appears if the USB driver is not installed or not initialized by Windows, or if the USB cable is not connected. The USB **LED** must illuminate on the Hall system! If it don't illuminate, unplug and plug in again the USB connector.

After connecting the USB cable or changing the USB port it can be that Windows installs automatically the **USB driver** again. Wait a little bit with starting of the Hall program because the driver installation needs a short time. In this case Windows should inform you that the driver is ready. If you start too fast, you get an error message because the driver is not yet installed. It could be that the program breaks and a new start of the software don't solve the problem. Then you have to reboot. Sometimes it can be necessary or helpful to make the base installation (registration) of the drivers again as described in chapter 2.2. Calling here the external FTDI installation program may solve the problem. See also the tips above.
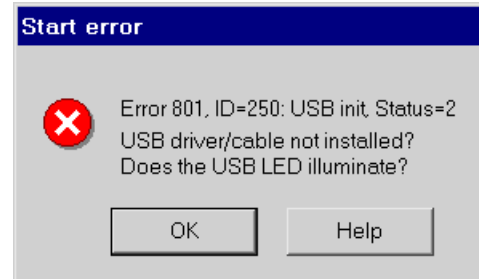
6.1.2 USB connecting for RH 2030/2035 version A

Version A works only under 32 Bit Windows, but not under a 64 Bit OS. You should **not connect** the USB cable to the measure system before complete software installation!

If you connect it first times, then you get from the Windows operating system the message that a new hardware was found and a driver software has to install. The face of message depends on your operating system.
Select here the first possibility '**Locate and install driver software (recommended)**'.
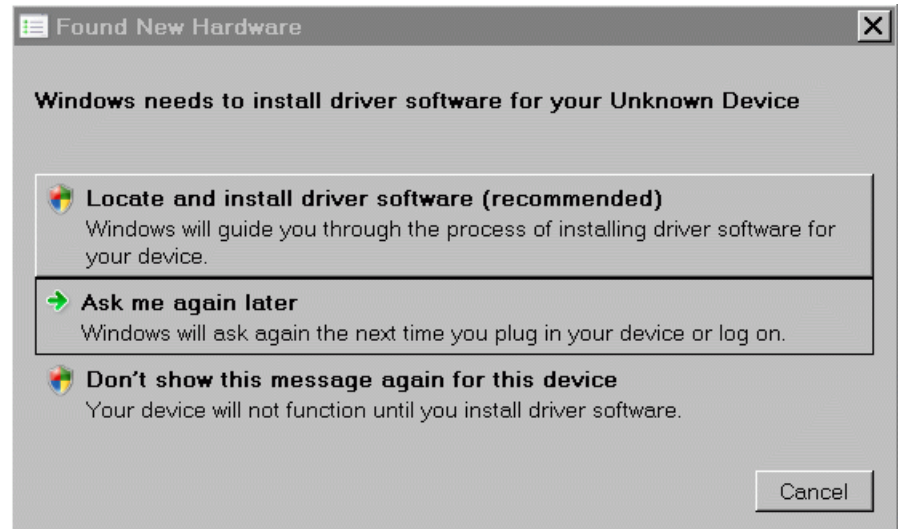
Then you get, depending on your operating system, following warning:

Select here the second possibility '**Install this driver software anyway**'.
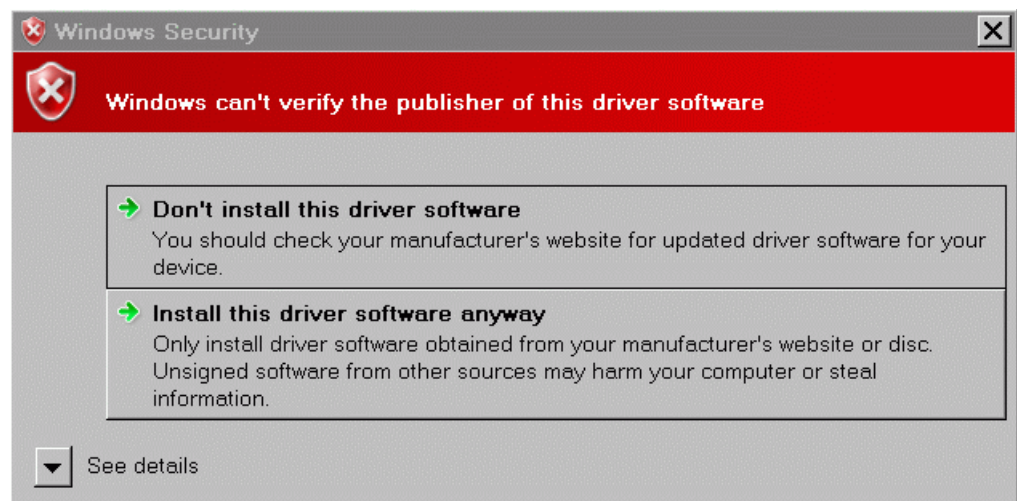
After installation you get in the system tray a hint that the installation was successful. In this hint is the message '**Cypress EZU-USB (2131Q/2131S/2135S) – EEPROM missing**'. Don't worry about the 'EEPROM missing'. The Hall system don't use this EEPROM. Administrator rights are necessary for a driver installation.

If you connect the measure system on another USB port, you get in the system tray a hint that a new driver software will be installed. After this you get the hint that the installation was successful, as described above. Depending on your operating system it can be that you must make a complete driver installation after changing the USB port, although the driver was already installed for another USB port.

Note: During the driver installation there is an icon in the system tray. But after the next start of Windows, if the driver is already installed, no icon appears when connecting the USB measurement system.

The **LED** near the USB connector on the Hall measurement system illuminates after trans-

ferring the firmware by the Hall program. This LED illuminates until the USB connection will be interrupted. The LED is active even the power of the Hall system is not switched on because the digital USB part of the Hall system uses the power of the computer.

If the Hall program breaks with an USB **error**, disconnect the USB cable, connect again, wait 30 seconds and start again. Sometimes it is necessary to restart Windows, for example after driver installation or changing the USB port. Wait 30 seconds after Windows start before starting the program.

The LED on the left side denotes the **power** of the Hall system. If power is not on, then the Hall program initializes the USB correctly but it stops at the hardware initialization with the message 'Measure system without power!'. In this case switch on the measure system and repeat the initialization.

Tips:

a) If an **USB initialization** problem occurs at program start try followings in this order:
- Disconnect and connect the USB port again.
- Reboot your PC.
- Try another USB port, not all USB ports of a PC are identical.
- Work without an USB hub or work with a powered USB hub.

After new connecting of an USB port **wait** a little bit. You should get an icon in the notification area of the Windows system tray with the information that the driver is ready.

b) The base installation of the **drivers** resp. the copying into the Windows directory will be done by the program installation. Sometimes it can be necessary to make this base installation again, see chapter 2.2.

c) The USB driver for the RH 2030/2035 version A doesn't run under a **64 bit** Windows.

d) Look in the **DevsList** under USB controllers whether there is 'Cypress EZ-USB …', see chapter 3.7.

e) If you get start or hardware problems, the program breaks with an error message and asks you for making a **report** file. Please send it to PhysTech if you have questions to us.

I

n the following the two main possible **USB problems** will be explained which can yield to an error message at program start:

The **start error 801** (USB init) appears if the USB driver is not installed or not loaded by Windows, or the USB cable is not connected.

After connecting the USB cable or chang- ing the USB port it can be that Windows installs automatically the **USB driver** again. Wait a little bit with starting of the Hall program because the driver instal- lation needs a short time. In this case Windows should inform you in the system tray the driver is ready. If you start too fast, you get an error messages because the driver is not yet installed. It could be that a new start of the software don't solve the problem. Then you must reboot.

Sometimes it can be necessary or helpful to copy the drivers again to the Windows direc- tory as described in chapter 2.2. See also the previous tips, especially all in (a).
If using a 64-bit Windows then you get a special error text.

The communication **error 720** can occur if there is a problem with the USB port.

The USB hardware works normally also at a **USB hub**. In some cases start problems occur if using a not powered hub, especially when connecting also other USB devices to this hub. This error can also occur later at a measurement, sometimes only every hour. Use in all these cases an USB hub with power or an USB port on the computer without a hub.
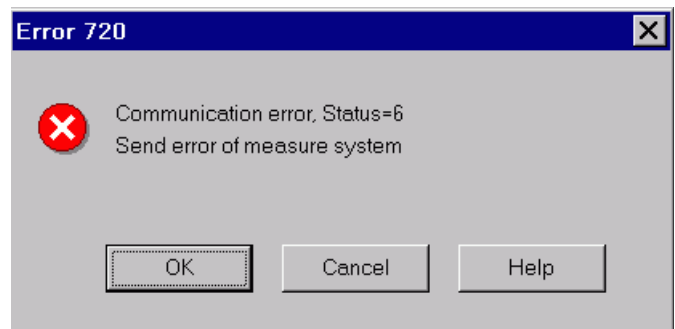
6.2 IEEE start errors

An IEEE488 board/interface is only necessary at the old Hall electronic or if your temperature controller need it. If one device, for example the temperature controller, need this interface, then the program initializes it at program start. If this is not successful, you get an error message. **Reasons** for this error message can be:

- No or wrong IEEE board selected, see also note below.
- No IEEE driver installed.
- IEEE board/interface not put in.
- An USB to IEEE interface may not work on a not powered USB hub. Connect it directly with the PC or use a bus powered hub. The 'Active' light must illuminate at the Keithley interface.

If you have **no** IEEE board selected, you get the following error message.

In this case you must select an IEEE board by Set_Conf, see chapter 3.2.

A similar error message occurs if you have select the **wrong** IEEE board:

'Iec_Keit.Dll initialization error. IEEE procedures are not available!'

Select in this case your correct IEEE board by Set_Conf.
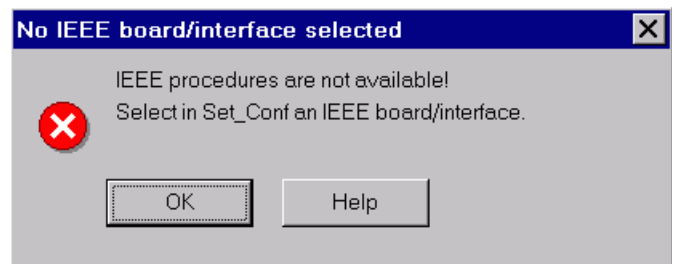
The same error message as for a wrong IEEE board occurs if the IEEE **drivers** were not installed. Install in this case the drivers of your IEEE board. You find these on the CD which comes with the IEEE board. The Hall program don't install IEEE drivers.

If using IEEE **devices**, more than the half connected devices (include the PC) must be switched on.

Note: The Hall program supports usually all **Keithley** boards, but not all Keithley drivers are compatible to all Keithley boards. You must install the correct driver. The new Keithley interfaces allow to install the Keithley (CEC) or NI (National Instruments) command compatible drivers. You have to decide this at the IEEE driver installation. The interface must then be selected as the driver installation, see chapter 3.3. Some older driver installation software installs sometimes not automatically the CEC driver. It is not sure that all Keithley boards support the CEC mode. If the software doesn't find the Keithley board in the CEC mode, try the NI mode. If this doesn't work, uninstall the CEC driver and install the driver for the NI mode.

Depending on the operating system and the CPU, the CEC drivers may not work for the Keithley **KUSB-488B** interface. So we recommend for this interface to install the drivers of the NI mode.

6.3 Cryo start errors

The program initializes at program start the port/driver and the cryo system and tries to read the temperature. If this is not successful then you get an error message. **Reasons** for this error message can be:

- Cable not connected or defect.
- Cryo controller not switched on.
- Temperature sensor has no connection or short circuit.
- Driver not installed.
- Wrong interface address of temperature controller.
- No or wrong IEEE board selected, only at using the IEEE interface, see above.

Depending on your temperature controller and the used interface the **start error** 801of the following kind can occur:
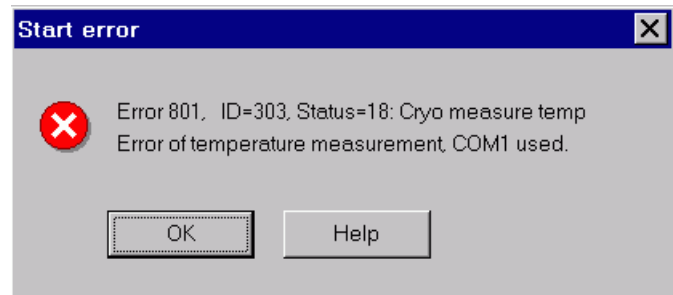
The 'ID' includes the program position at which the error occurs, the status gives a hint of the communication problem. At using a COM port its number will also be shown.

The following list contains the important cryo start errors:

- **ID=300:** The temperature controller uses a COM port which not exist at the computer. This error can occur only at a RS 232interface, also called COM port.
- **ID=301:** It was not possible to send initialization commands to the controller.
- **ID=303:** An error occur at the temperature measurement.

If the hardware is okay, then a wrong controller address is the main reason for the errors with the ID 301 and 303. See chapter 3.3 for setting a new address. Because initialization commands are not necessary for all controllers the temperature measurement can be the first communication with the controller. A wrong address don't yield to an error if only sending commands to an existing COM port. In this case the error occurs at the temperature measurement because here an answer will be read.

COM1 to COM9 will also be used at a **virtual com port** by an USB to RS232 converter. Some controllers have an USB connection which will also be used as a virtual com port. You have usually to install a driver for the virtual com port. Check at the use of a virtual com port in the Windows device manager or in DevsList (chapter 3.7) which virtual com port will be used. **Changing the USB** port yields to another virtual com port number! In this case you have to change the COM port number for the cryostat.

After the error with the ID 301 or 303 you get a question for **Select next action**:

- **Break of program:** Exits the program.
- **Repeat initialization:** Repeats the initialization or reading of temperature. If the controller was switched off, switch it on and use this mode. This mode is not available if using init commands at a COM port.
- **Ignore error (only for test):** This is only for testing program start because you get cryo errors during the run of program.
- **Work without this hardware:** The program will not use the temperature controller, so you can not measure and set the temperature.

6.4 Protection key errors

If you don't use the lite or portable program, a valid protection key must be detected for running the Hall program. If it will not be found, the program stops with an error message, for example with the message shown on the right side.
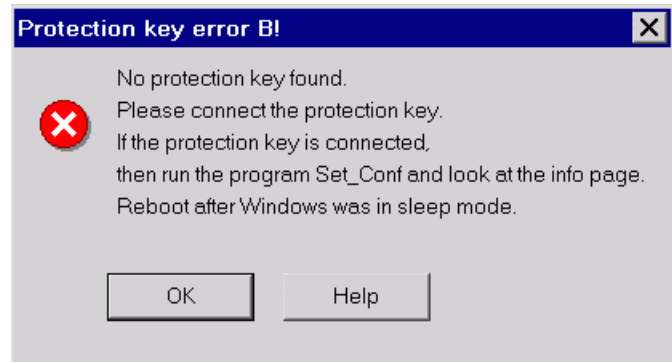
The following lists the **main errors**:

A) **No protection key driver found:** No driver for the Hardlock or Sentinel protection key was installed. Run the program Set_Reg and install the drivers, see chapter. 2.2. There you can also call the external program HASPUserSetup. This program comes with the new CD and the newest version is always included in the optional package (see chapter 5.2) but not in the full program (update) package. Use it if the hardlock key will not be found after the normal installation. Don't forget to reboot. The Set_Reg program can also be called from the Edit tab sheet of Set_Conf.

B) **No protection key found:** Please connect your protection key. If a protection key is connected then there is another problem. Run the program Set_Conf and look at the info page to get more information, see chapter 3.5. A reason may be that Windows don't load the driver after the sleep mode. In this case reboot.

C) **Protection key of wrong licence found:** The software has found a key but it is not that one for the installed licence. Change your protection key or your licence. For changing your licence use the program Set_Reg, chapter 5.3. Another licence file resp. package is necessary.

D) **Wrong type of protection key, simulation key found:** You have installed your software for the measurement key, but you have connected your simulation key. Change the protection key type in Set_Conf, see chapter 3.1, or connect the correct key.

Tip: You get more information by the Info sheet of the Set_Conf program, see chapter 3.5, and in the device list (chapter 3.7).

Note: The new Sentinel protection keys are driverless, no special driver must be installed.

Old keys: The old hardlock protection keys for the LPT port need a real parallel port and not only an USB to LPT converter. These old keys don't run under a 64 bit Windows.
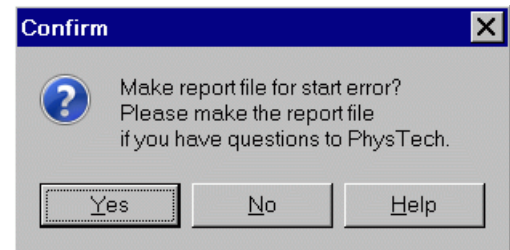
6.5 Report

Report files are a big help to detect the reason for start or configuration problems/errors, a defect hardware or software bugs. The report files will be made automatically if the start fails, but they can also be created manually. If contacting PhysTech for a help of a problem or error, please attach the report file to your eMail. Please use always the newest program version before contacting PhysTech.

Following possibilities of making a **report file** exist:

1. If the main program breaks the **start** with an **error** message then you can make the report file Diag\Report\Rep_Err.Zip. This report file includes all relevant files as the HardSoft.CFG and the Log file of the program start.
   Application: If you need the help of PhysTech to solve the start problem attach this report file to your eMail.

2. You can make a report file by the program **Set_Conf**. There is the button 'Report' on the tab sheet 'Tool', see chapter 3.7. Only the first option (Apply changes) should be activated at the input window. The report file is Diag\Report\Report.Zip. This file includes more information as Rep_Err.Zip but includes only the start problems if the last start failed.
   Application: Attach the Report.Zip file to your eMail if you have questions to PhysTech about the configuration.
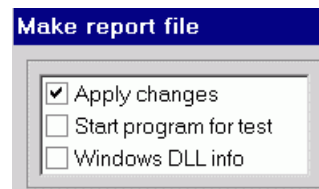
3. **Diagnose** options exist at program start, see chapter S1.1.3 of the Software Manual. Here you can select the diagnose mode. The program saves some or all communication commands into a report file. After leaving the program you get an information window about the report file name, usually Diag\Report\Diagnose.Zip. Use these diagnose modes only after authorization by PhysTech.
   Application: If you have measurement problems start the program with a diagnose mode, usually D1. Make then one measurement (normally a single transient), save the measurement, leave the program and send the report file to PhysTech.
   If you have problems with the cryo system use diagnose mode D5 which reports only commands of the temperature controller.
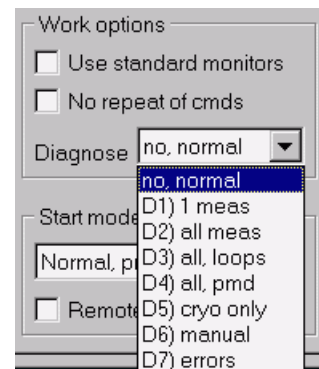
4. Combination of 3 and 2. Start the program in the diagnose mode as described in 3. If the program hangs (don't answer), call the task manager and close the Hall program. Call then the Set_Conf program and make the report file as explained in 2. If you do it on the same day then this report file includes also the diagnose files.
   Application: If the program **hangs** during the measurement use this mode and send the Report.Zip file to PhysTech.

5. If you select D7 as diagnose mode then only errors and semi-errors will be reported. If exist then you can pack the files to Rep_Sem.Zip. Semi-errors are problems with the communication which don't lead to errors because command repetition.
   Application: Communication problems for example by bad cables or contacts.

6. You can make also a report file from the main program, see chapter S2.4.7.2 of the Software Manual. Its name is Diag\Report\Rep_All.Zip.

7. Internals

7.1 Directory structure

PhysTech is the main program directory in example 1 of chapter 1, PhysTech\Hall the base program directory: Following directories are system sub directories of the base program directory **PhysTech\Hall**:

Bin: Executable and DLL files
Sys: Sub directories of 'Sys' contain all system files.
Sys\Doc: All documentation and help files, they have the extension Txt, PDF or HLP.
Sys\Cryo: Initialization files for the cryosystem.
Sys\Meas: Initialization files for the measurement system.
Sys\Initdat: Further system files,
Sys\Install: Files and drivers for the installation.
Sys\Init: Default user initialization files (original start).
Sys/Base: Only a copy of the original 'Sys\Base' from CD and will not be used.

Conf: All customer system files. If you make changes of files from 'Sys\Cryo' or 'Sys\Meas' with the SetUp program, see 3.6, these changed files will be copied to 'Conf'. If a system initialization file is necessary for program start, this file will be first searched in 'Conf' and then in 'Sys\Cryo' resp. 'Sys\Meas' resp. 'Sys\InitDat'. If you have not made changes for the cryosystem this directory is normally empty after installation.
Conf\Base: Here is the main configuration 'HardSoft.Cfg' and the licence file 'System.Bin'.
Conf\Init: Default modified user initialization files (cold start). This directory is empty after installation.

Work: Calibration, relay report and temporary files and the user list, normally empty after installation. You must do a calibration after the first program start.
Diag: Diagnose and report files.

Following directories are sub directories of the base data directory **PhysTech\HallData** (example 1 of chapter 1):

Data :   Common data directory for all users, empty after installation. After saving measure data here are the data base files for common measure data. As sub directories here are the subgroup data directories, for example 'Default'.
UserX: Personal data directory for the user with name UserX, will be created after first program start. After saving measure data here are the data base files for personal measure data. As sub directories here are the subgroup data directories, for example 'Default' or 'Simul'.
Data\Init: Common user initialization files for users which have no Personal init files.
UserX\Init: Personal user initialization files.

Following special sub directories of the **Sys\Install** exist:

Bde_Msi: Installation files for the BDE and OCX/ActiveX tools
Hardlock: Additional installation and test tools for the hardlock protection key
Usb: Drivers for the USB installation of the measurement system
Zip: Licence package and download files of update/bugfix

Following special sub directories of **Work** exist:

Buffers: Temporary files during run of program.
Last: Configuration parameters of last run of some external program tools.
Remote: Files for the remote working, exist only if remote working was used.
Users: User list files, one file with user name and so on for every user.

Following special sub directories of **Diag** can exist:

Diagnose: Files saved during diagnose mode.
Monitor: Files saved by the Monitor, see chapter S2.4.7 of the Software Manual.
Report: Files done by the Report, see chapter 3.7 and S2.4.7.
Start: Log files of program start, Start_A.Log is for the measure program.

All initialization files, system and user, have the extension 'Cfg'. In Files.Txt of 'Bin' and 'Sys\Cryo' you find a file list.
At an update only the files in Bin and Sys will be overwritten, but not in Conf, Work and the data directories.

7.2 Files

Extensions of the main used files:

BIN: Binary file
CFG: ASCII configuration file
DBF: DBASE database file
DLL: Dynamic link library, program parts which will be loaded during program run
EXE: Executable file, separate program
HAL: Binary Hall data file
HLP: Help file of some ActiveX tools
LOG: Log file from program start, monitoring or installation
PDF: Documentation file in PDF format
TXT: ASCII text file
ZIP: Packed file with complete program files, licence or report files

The Hall measurement data will be saved into binary data files. The format depends on the measurement. Every file starts with a header of 512 bytes, then the main measurement data follows.
You can edit the loaded file in its Edit menu and there save into an ASCII file. The external program DataConv converts one or more binary data files into ASCII files.

7.3 Documentation files

Main manuals:

1. HlMan_Hardware.Pdf   : Hardware
2. HlMan_Install.Pdf   : Software installation
3. HlMan_Software.Pdf   : Software
4. HlMan_Basics.Pdf   : Basics and applications
5. HlMan_Theory.Pdf   : Theory

Additional and old manuals:

1. HlAdd_Version.Pdf   : Features of the new software version
2. HlAdd_KeyFeatures.Pdf   : Key features overview
3. HlOpt_Scan1.Pdf   : Scanning Hall
4. HlOld_Flyer_2010.Pdf   : Old flyer for RH 2010
5. HlOld_Picts.Pdf   : Old pictures

Main text files:

1. CryoFile.Txt   : Supported cyrostats
2. Data.Txt   : Structure of binary Hall data files
3. Diagnose.Txt   : Files and options for diagnose
4. Hal_Eval.Txt   : Eval modes of Hal_Eval.Dbf
5. Eval_X.Txt   : Customer evaluation database

All documentation files are in the directory Sys\Doc.

7.4 Software options

Expert: Enables user class 4 and higher, many additional features, important in all program parts.

Plot: Enables extended plot functions and plot programs, like many graphic formats, 3-dimensional plots, presentation plot program.

Routine: Enables special program module for easy rep. routine work.

FullSoft: Enables full software in I/V and Hall program module. For example, the V/I program module and the compensation needs this option. Enables user class 5 and 6 if Expert option is enabled.

Magneto: Program module for vdP measurements as a function of magnetic field.

Tempscan: Program module for measurements as a function of temperature.

Timescan: Program module for measurements as a function of time.

Probes: Allows to measure automatically many samples with a scanning option, special hardware necessary.

Seebeck: Program modules for isothermal and temperature depending Seebeck measurements, special hardware necessary.

Not all software options are enabled for all customers. It depends on the software package and on the hardware. The old software option 'Database' is now included in the base software. The RH 2035 comes normally only with the Expert, Routine and Database option, the maximum user class is 4. The RH 2030 comes with all options from Expert to Magneto or to Timescan.

7.5 List of predefined cryo controllers

The following give a list of predefined temperature controllers. The first number is the cryo file number, so 310 means cryo file 'Cryo_310.Cfg'. Numbers marked by a '*' can not directly be selected by the input of model (chapter 3.4) but only by the number.

110) Keithley, resistance, Pt100, table TCal_11
120) Keithley, resistance, Pt500, table TCal_12
130) Keithley, resistance, Pt1000, table TCal_13
150) Keithkey, voltage, Si diode, table TCal_21
210)* Lakeshore DRC91 old, wait=200ms
220)* Eurotherm 8XX/9XX, Celcius
221)* Eurotherm 2416, Celcius
223)* Eurotherm, 24XX, mV, Pt1000, table TCal_33
230) T3000
235) Cryogenic 32B, 44C, loop 2, sensor B
236)* Cryogenic 32, loop 1, sensor A
240) MMR K-20
250) Lakeshore 325,331,332,340, simple
251) Lakeshore 330
252) Lakeshore 331,332
253)* Lakeshore 325
254) Lakeshore 335, 336
255)* Lakeshore 331,332, Loop 2
256) Lakeshore 340
260)* Lakeshore 340, port C
261)* Lakeshore 340, wait=100ms
270) CryoVac 304
275) Scientific Instruments SI 9700
280) Temptronic TP0315B
290) AirLiquid TB200
310) Lakeshore DRC91 old, BioRad He old
320) Eurotherm 8XX/9XX, K
321) Eurotherm 24XX, K
330) Oxford ITC503
340)* T9650
350) Lakeshore DRC93, DRC91 new
360) Oxford ITC502, ITC4
410) BioRad N2 old
510) BioRad N2
520) BioRad He
530) AME
540) Chinon
550) Linkham old
560) Linkham new

7.6 Base configuration file HardSoft.Cfg

The following list give an example of the base customer configuration file HardSoft.Cfg. It is in the directory Hall\Conf\Base. Lines 201 to 250 are not shown, these are only for the internal use.

A '*' separates the value/text from the comment. *R denotes a reserved line, *S a system value, *A an additional value/option and *E and extended value/option. Values resp. options without these marks can be changed in the SetUp program.

```
PT4200203001F102000000000000000010010000
2013-10-16  *S Main Hall configuration file
2013-10-16  *S Program date for version 4.0
        0       *R reserved
        0       *R reserved
        0       *R reserved
        0       *A ExternStart (0:std, 1:noMsg, 2:autoOff)
        0       *E ExtOption
        0       *E CFG (Bit 0-4:Init,InitDat,Cryo,Meas,Base)
        0       *E Conf (1-5:Base,Conf,HardSoft_X,Base_X,Conf_X,+20:noPath)
G:\Test     *E New path (1:Base, 2:Conf, 4,5:Main)
-   *---------------------- Pathes, network (line 12) ----------------------
        1       *N Path mode for library (0:prog, 1:group, 2:personal, 3:inp)
C:\PhysTech\Hall  *N Main path of library
        0       *  Portable (0:no, 1:server, 2:portable, 3:trial)
        0       *  Use local/temp buffer directory
        1       *  Path mode for group (0:prog, 1:auto, 2:common, 3:inp, 4:3+work)
C:\PhysTech\HallData  *  Main path of group
        0       *R reserved
        0       *R reserved
4,1,6,1     *  Path mode, personal path, max user class, options for new users
        0       *R reserved
    0,80        *  Proxy (Bit 0:use, 1:authent), port
proxy.de    *  Proxy server
        2       *  DataBase (1:Table, 2:BDE, 3:ODBC, 4:OLE, 5:ADO)
Provider=Microsoft.Jet.OLEDB.4.0;Extended Properties=dBASE IV;Data Source=  *A
        0       *R reserved
        0       *R reserved
        0       *R reserved
        0       *R reserved
        0       *R reserved
        0       *R reserved
        0       *R reserved
-       *---------------------- Options (line 34) -------------------------
3,0         *  Default user class mode, DateFormat (0:Windows, 2:yyyy-mm-dd)
        0       *  DOS DataFiles (0:no, 1:read avail, 2:1&export, 3:1&save)
        0       *R reserved
        0       *E User DLL (Bit 0:Fct, 1:Proc, 2:Prog, 3:Simp, 4:Full)
        0       *R reserved
        0       *R reserved
0,0,0,0     *S SubProg Number, SetName, AskStart, Option, see below
        0       *R reserved
        0       *R reserved
0,128,0,0   *A Not Sample avail, show, doping, start
        0       *R reserved
0,0,0,0,0   *R reserved
0,0,0,0     *E SQL Eval_X Database, Opt, StdDatabase, Res (see in Eval_X.CFG)
0,0,0,0     *E Customer Database, Opt, AutoName, AutoOpt
        0       *R Reserved
-       *---------------------- DLL, IEEE, WIN (line 50) -------------------
        0       *  IEEE board (0:no, 3:User, 4:Keithley, 5:NI, 6:Agilent)
```

```
            *A IEEE board name
 21,0       *A IEEE address of PC, TimeOut (time in [ms], 0:default)
 0,-1       *A IEEE Port address (0:default), DMA channel (-1:no DMA)
     2      *A IEEE options (Bit 0:str-receive, 1:str)
     0      *E User IO DLLs (Bit 1:Lpt, 2:Com, 3:Usb, 4:Net, 7:Pio)
     6      *E Load always IO DLLs (Bit 0:IEEE, 1:Lpt, 2:Com, 7:Pio)
     0      *R reserved
     0      *R reserved
     0      *R reserved
     0      *R reserved
FoxitReader *  PdfReader
     0      *  HelpMode (0:Adobe, 1:ActiveX, 2:PlugIn, 4:Foxit, 5:Sumatra)
   0,0      *A Simulation mode (0,0:normal)
     0      *A WinOption (Bit0:timer, 2:ColorPrn)
-  *---------------------- COM-TimeOuts (line 66) --------------------------
   100      *A ReadIntervalTimeout --- TimeOut -1 ---
   100      *A ReadTotalTimeoutMultiplier
   100      *A ReadTotalTimeoutConstant
   100      *A WriteTotalTimeoutMultiplier
   100      *A WriteTotalTimeoutConstant
   100      *A ReadIntervalTimeout --- TimeOut -2 ---
   100      *A ReadTotalTimeoutMultiplier
   100      *A ReadTotalTimeoutConstant
   100      *A WriteTotalTimeoutMultiplier
   100      *A WriteTotalTimeoutConstant
     0      *R reserved
     0      *R reserved
     0      *R reserved
-  *---------------------- Hardlock key (line 80) --------------------------
     0      *  LogInMode (-1:lite, 0:measure, 1:simul/remote, 2:server)
     0      *A Stay in LogIn (0:no, 1:yes, 2:auto)
     0      *  PortSearchMode (0:auto)
3BCp        *  String for HL_SEARCH
     0      *S Server licences
     1      *S HardwareTyp of key (0:LPT, 1:Hardlock, 2:Sentinel)
     0      *R reserved
     0      *R reserved
     0      *R reserved
-  *---------------------- Licence (line 90) ------------------------------
Internet    *S Licence name
    40      *S Licence number
    40      *S Main licence number
            *S List of licence numbers
     0      *S Many licences
     0      *A Use main licence number (1:lib, 2:data, 3:1&2)
     0      *S AltLicence
     0      *R reserved
     0      *R reserved
-  *---------------------- Software options (line 100) --------------------
Y           *S Expert (Y/N)
N           *S Extented functions
Y           *S Extented-plot
Y           *S Routine module
Y           *S Enhanced
N           *R reserved
Y           *S Full software
N           *S Seebeck
Y           *S Magneto
Y           *S Temperature depending
Y           *S Time depending
N           *R reserved
N           *S Probes
N           *R reserved
```

```
N           *S PhysTech
N           *S Siggi
N           *R reserved X1
N           *R reserved X2
N           *R reserved X3
N           *R reserved X4
      0     *S Special options
      0     *S SoftOptiH
ABCDEFGH    *S SoftOptiFKey
ABCDEFGH    *S SoftOptiVKey
      3     *S OptionLog (Bit 0:OtherLic, 1:EvalProg)
      0     *S SubProg avail (Bit 0:Hall)
      0     *R reserved
      0     *R reserved
free        *S free
- *--------------------- Cryo/address (line 130) ------------------------
      2     *  Cryosystem-temperature file-number (see in DOC\CRYO.TXT)
      0     *  Second cryosystem-temperature file-number
 1.0E-4     *A Cryo 68k internal current [A]
      0     *E Number of switch file (0:no file)
      0     *E Number of adix file (0:no file)
 700,1,0    *E Switch PeriAdr, Bits, Flag (Bit 0:start, 1:end, 2:temp, 3:load)
-1,0,-1,0   *S Install cryo file (Adr, SecMeas, TempCmd, Opt)
0,80,Host   *E Switch Port, Port, IP
      0     *R reserved
      0     *R reserved
      0     *  Monitor (Bit 0:yes, 1:NoRepeat, 3:Err)
Hall        *A Name of 68k/Hex-file
    522     *HA Address of the Hall-system [6,311,522]
   8000     *A Poll wait timeout [ms]
     13     *A Repeat at error (Bit 0:Send, 1:Enter, 2:FullEnter, 3:CheckEnter)
      3     *A 68k-Flag (Bit0:load, 1:exit, 3:sleep)
      0     *A Load DLL (0:auto, 1:Mio_Name, 2:68k_Name)
Mio_Std     *A Name of external 68k-DLL
      0     *R reserved
- *--------------------- 68k options (line 150) ------------------------
     10     *HA Magnet file number (1:elec-68k, 10:elec-USB, 20:perma, 30:He)
      0     *A 2. Magnet file number (0:no)
     10     *HA Auxo file number (0:no, 1:68k)
      0     *A ManiFileNr
      0     *A BarcodeFileNr
      0     *A CustomerDataBankFileNr
      0     *R reserved
      0     *R reserved
      0     *R reserved
      0     *A Seebeck cryosystem file number
0,0         *HA Disable magnet, four point (Bit X: SubProgNbr)
      0     *R reserved
      0     *R reserved
      0     *R reserved
      0     *R reserved
      0     *R reserved
      0     *R reserved
      0     *R reserved
 5.000E+01  *A Frequency of power supply [Hz]
- *--------------------- 68k hardware (line 170) ------------------------
     10     *HA Matrix file number (1:68k, 10:USB, 30:Kei)
     10     *HA Voltage file number (1:68k, 10:USB, 30:Kei)
     10     *HA Current file number (1:68k, 10:USB, 30:Kei)
      0     *R reserved
      0     *R reserved
      0     *R reserved
      0     *R reserved
```

```
        0       *R Reserved
      0.0       *A Voltage offset [V]
    32000       *A Current calibration for USB
        2       *A Hardware type
        2       *A Hardware type
        2       *A Hardware type of CPU-68k (1:old)
        2       *A Hardware type of IEEE-card for 68k-system
        2       *A Hardware type of control board
        2       *A Hardware type
        1       *A Hardware type
        2       *A Hardware type
        1       *A Hardware type
        1       *A Hardware type
        0       *HA Optical board
        0       *HA Numbers of amplifiers (68k 0:cable, 2:switch)
        0       *HA HardOpt (Bit 0:Barshape, 1:InLine)
        1       *HA HardFeat (Bit 0:Compens, 1:PreAmp)
        0       *R reserved
        0       *R reserved
        0       *R reserved
 32030000       *S Hardware model
        0       *A Hardware base type, see below
-   *---------------------- Internal use (line 200) ------------------------
```

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