HWIDS Hardware Identification System

HDU & HDI

User Manual Version 001

think forward

The information in this manual may be altered without notice.

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Introduction 1

Introduction 1.1

The Hardware Identification System (HWIDS) was designed to automatically detect and recognize various Bruker hardware components connected to the console and their changes (e.g. when a unit is added or removed).

This manual is included with the delivery of the Hardware Detection Unit (HDU) and Hardware Detection Interface (HDI). It provides instructions on how to:

- Install and wire the HDU and HDI units.
- Configure and operate the units.

Disclaimer 1.2

The unit should only be used for its intended purpose as described in this manual. Use of the unit for any purpose other than that for which it is intended is taken only at the users own risk and invalidates any and all manufacturer warranties.

Safety Issues 1.3

Please read the following information carefully. It provides important instructions on safety, usage and maintenance of the device.

- Never use the device if it is damaged in any way.
- Use the device only for the intended purpose.
- Keep the device and cables away from heat, moisture, sharp edges, etc.
- Do not use the device outdoors.
- Always operate the device in a safe and dry place.
- The HDU and HDI should only be operated by qualified personnel.
- Service or maintenance work on the unit must be carried out by qualified personnel.
- The HDU and HDI may only be used with original manufacturer accessories.
- The ambient temperature is defined by BRUKER (refer to the Avance site planning manual).
- Read this manual before operating the unit. Pay particular attention to any safety related information.

Warnings and Notes *1.4*

There are two types of information notices used in this manual. These notices highlight important information or warn the user of a potentially dangerous situation. The following notices will have the same level of importance throughout this manual.

Note: Indicates important information or helpful hints

WARNING: Indicates the possibility of severe personal injury, loss of life or equipment damage if the instructions are not followed.

Contact for Additional Technical Assistance *1.5*

For further technical assistance, please do not hesitate to contact your nearest BRUKER office or contact us directly at:

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Terms and Definitions

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The following terms and definitions are applicable for this manual:

ATMA: **A**utomatic **T**uning and **Ma**tching

BIS: **B**ruker **I**nformation **S**ystem

EMI: **E**lectro**m**agnetic **I**nterference

HDI: **H**ardware **D**etection **I**nterface

HDU: **H**ardware **D**etection **U**nit

HWIDS: **H**ard**w**are **Id**entification **S**ystem

MPM: **M**emory board **P**lug **M**ountable

MUM: **M**emory board **U**nit **M**ountable

PICS: **P**robe **I**dentifi**c**ation **S**ystem

SBS-Bus: **S**erial **B**ruker **S**pectrospin **Bus**

SOAP: **S**imple **O**bject **A**ccess **P**rotocol

UPNP: **U**niversal **P**lug a**n**d **P**lay

Terms and Definitions

HWIDS General Information

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Introduction

The Hardware Identification System (HWIDS) is a electronic system for automatic identification of external components such as RF coils etc. This system was developed to prevent damage to these devices, for example, by high power when a component's parameters weren't updated during a component change.

Functional Characteristics

The functional characteristics of the HWIDS include:

- Automatic component identification.
- Automatic detection of the connecting and disconnecting of components.
- A sleep mode which prevents any EMI distortion.

HWIDS Overview

In BRUKER HWIDS compatible units is a memory installed that contains information about the component, such as component name, serial number, production information, device specifications etc.

The Hardware Detection Unit (HDU) reads and stores this information and detects component changes. Each HDU can monitor up to 8 components. The information about the components and their changes are transferred to the Hardware Detection Interface (HDI) through the SBS-Bus. The HDI can connect up to 4 HDU's. The spectrometer workstation is connected with the HDI via ethernet. The HDI is controlled by the BRUKER spectrometer software (TOPSPIN or PARAVISION) through the SOAP and UPNP protocol.

It is important to ensure no electromagnetic interference during a measuring sequence. For that reason the HDU has a 'SLEEP' mode, whereas the HDU generates no EMI.
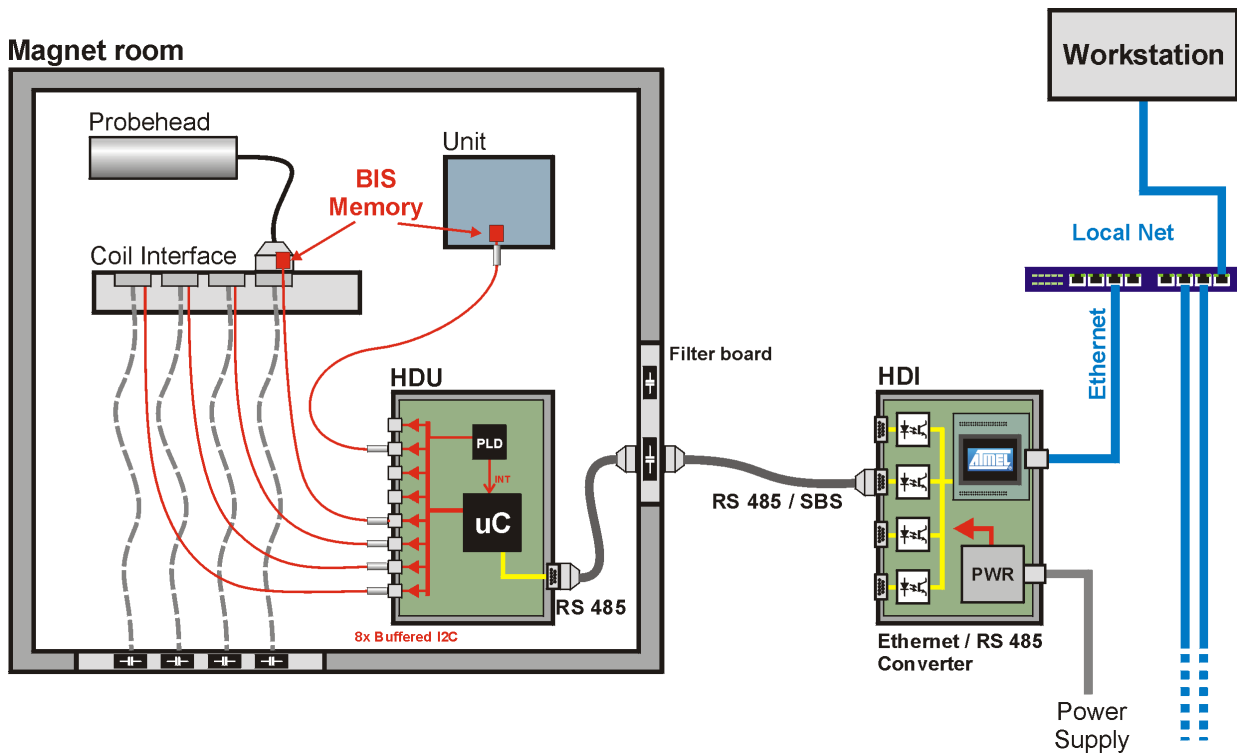
Figure 3.1.   Typical Setup of the HWIDS Configuration

The Hardware Detection Interface

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Purpose *4.1*

The Hardware Detection Interface (HDI) is one of the main components of the HWIDS. It is designed for interfacing the HDU with the spectrometer workstation. The HDI is controlled by the BRUKER spectrometer software, either TOPSPIN or PARAVISION.

The update functionality is provided through a Web interface (**see *"Firmware Update" on page 29***).

For instructions on how to setup the device refer to *"Preparing the HDI for Use" on page 21*.

Functional Characteristics *4.2*

The essential HDI features include:

• Control of up to 4 HDU's.

• Simple connection to a workstation via Ethernet.

• Provides a SOAP server and a UPNP client.

• DHCP support for auto addressing.

• Web server application for firmware updates.

• Monitor output for HWIDS (HDI + HDU) state informations.

Shipping List *4.3*

The HDI is delivered with the following components:

• HDI Unit.

• Power cord.

• Ethernet cable.

• User Manual.

Inspect the package for any missing parts before putting the HDI into service for the first time.

Operating the HDI 4.4

The HDI is a self-sustaining system which requires no operator intervention. The only operating instructions required are for setting up the device.

HDI Setup 4.5

The following section provides information useful for setting up the HDI.

Connectors, Switches and Indicator LED's 4.5.1

For the following description refer to **_Figure 4.1._**.

The USB host and device connectors on the HDI are not used, they have no functionality.

Reset Switch

The reset switch is used to reset the unit. **Only push this button when absolutely needed as NMR measurements in progress will be disturbed.**

Ethernet Port

The Ethernet port is used to connect the spectrometer workstation to a Local Area Network (LAN) via a 10 or 100 MBit/s compatible ethernet switch.

Ethernet Connection LED

The Ethernet connection LED indicates when the HDI is successfully connected to a LAN. The LED will be illuminated when the connection is active.

Ethernet Traffic LED

The Ethernet traffic LED indicates when there is data traffic on the ethernet bus. When data is transferred, the LED will flash.

Monitor Port

The monitor port can be used for an option or service connection to a PC using an RS232 interface. Using a terminal program, e.g. MS Windows HyperTerminal, it is possible to view messages from the HDI which concern the operational state of the entire HWIDS system.

The terminal settings for this port are:

- 115200 baud.
- 8 data bits.
- No parity.
- 1 stop bit.
- No handshake.

State LED 1 and 2

LED 1 ON: An **HDI** error has occurred.

LED 2 ON: An **HDU** error has occurred.

LEDs OFF: Normal operation without failures.

Start Condition Switch

Speed settings for the SBS communication between HDI and the HDUs. Be sure that both baud rate settings (HDI and HDU) are the same, otherwise communication will fail. The HDI supports the following bus speeds:

0: 9600 Baud
1: 19200 Baud
2: 38400 Baud
3: 57600 Baud

If the bus speed is changed during operation, the HDI has to be reset before the changes are accepted.

Active LED 1 - 4

The respective LED is illuminated if there is traffic on PORT 1 - 4. If the HDU is in Sleep mode, the LED's are signalizing if there is although communication on the bus. In some cases, data traffic (indicated by a flashing active LED) may disturb NMR measurements during sleep mode.

PORT 1 - 4

SBS Bus interfaces to connect the HDUs. For further informations about these interfaces, read the BRUKER SBS Bus specifications.

Mains supply

Input voltage 100 - 240V, 50-60Hz. Connect the unit to the mains supply only with the enclosed power cord. To switch off the HDI, unplug the power cord.

Fuse Holder

Only use 2 x T250V~, 1.0 A fuses.

The Hardware Detection Interface

Reset Switch

USB Host Connector, not used at the HDI

USB Device Connector, not used at the HDI

Ethernet Traffic LED

Ethernet Port, 10/100 MBit

Ethernet Connection LED

Monitor Port, RS232

State LED 1 and 2

Start Condition Switch, Baud Rate setup

Port Active LED 1 - 4

PORT 1 - 4, RS485 / SBS Bus

Mains Supply, 110 - 230V, 50 - 60Hz

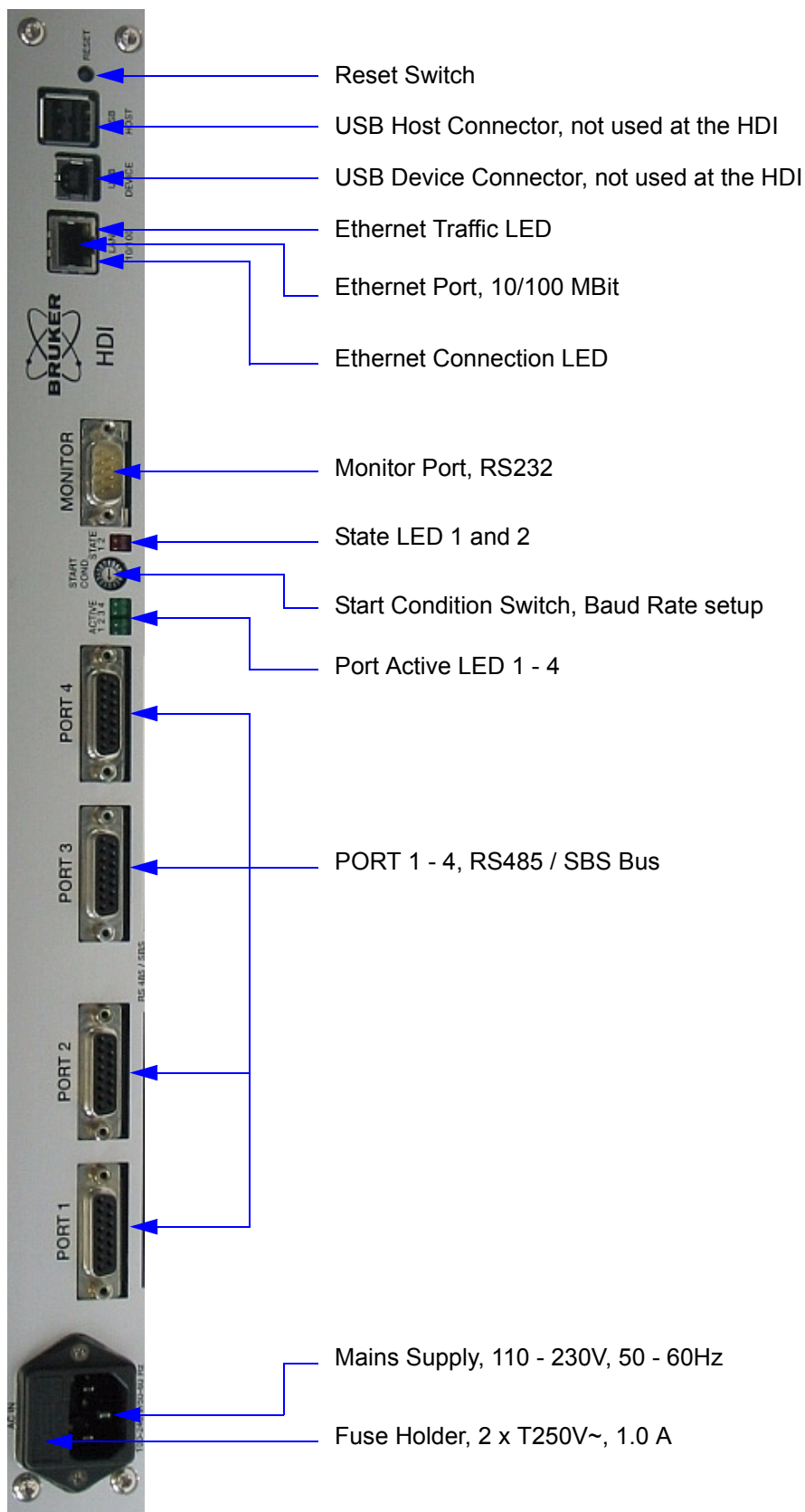Fuse Holder, 2 x T250V~, 1.0 A

Figure 4.1.   The HDI Front Panel

The Hardware Detection Interface

The Hardware Detection Unit

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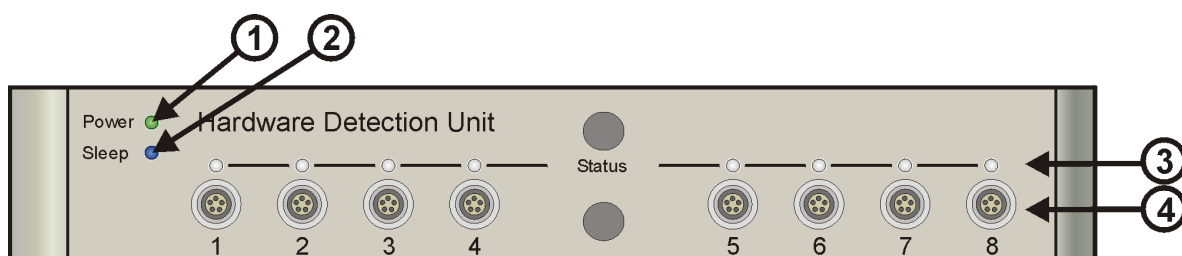*Overview of the HDU Connections and Indicators*   *5.1*

Figure 5.1. HPPR Housing - Front View

①   Power Indicator: Green illuminated - the HDU is ON

②   Sleep Mode Indicator: Blue illuminated - the HDU is in 'Sleep' Mode

③   Status Indicators:
Green illuminated - Hardware component is connected and ready to use.
Orange blinking - Reading memory/erasing memory/writing to memory.
Orange illuminated - Hardware component is connected but not ready to use.
Red illuminated - Error.
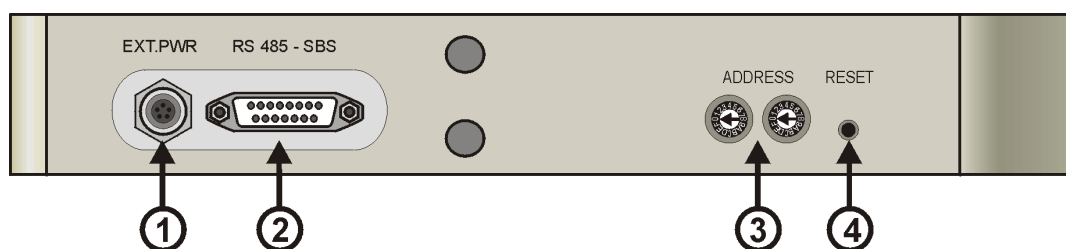Off - No hardware detected.
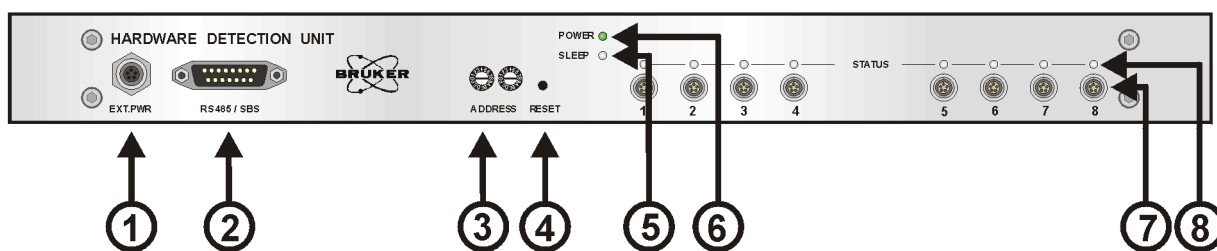
④   Terminals for external components

Figure 5.2. HPPR Housing - Rear View

①   External Power Supply Terminal

②   RS 485 Terminal - Connection to the HDI

③   SBS-Bus Address Switches

④   Reset Button

Figure 5.3.   19" Housing - Front View

①   External Power Supply Terminal

②   RS 485 Terminal - Connection to the HDI

③   SBS-Bus Address Switches

④   Reset Button

⑤   Sleep Mode Indicator: Blue illuminated - the HDU is in 'Sleep' Mode

⑥   Power Indicator: Green illuminated - the HDU is ON

⑦   Terminals for external components

⑧   Status Indicators:
Green illuminated - Hardware component is connected and ready to use.
Orange blinking - Reading memory/erasing memory/writing to memory.
Orange illuminated - Hardware component is connected but not ready to use.
Red illuminated - Error.
Off - No hardware detected.

External Components Supported   *5.2*

You can connect following components to the HDU terminals:

- Any components with a 'HWIDS' memory board.

- Probes with a PICS module.

- Probes with an ATMA module.

The HDU can read the BIS information from these units and detect when these units are connected/disconnected.

The HDU does not have the capability of controlling motors in ATMA modules.

Do not connect more than one probe with an ATMA module to the HDU.

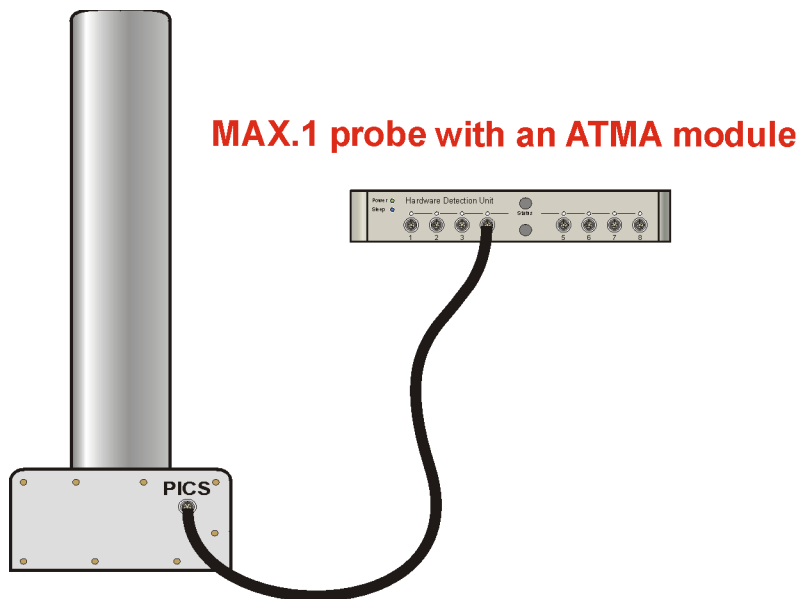*Do not connect more than one probe to an ATMA module!*

MAX.1 probe with an ATMA module

Figure 5.4.   Connecting a Probe to an ATMA Module

The Hardware Detection Unit

Preparing the HDU and HDI for Use

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Introduction   *6.1*

There are several steps that must be taken before the HDI and HDU are used for the first time. Please read this chapter carefully and adhere to the information provided. Failure to do so may result in the unit not operating correctly.

Wiring the HDI   *6.2*

The folowing cables have to be connected in the order provided (refer to the figure below):

1. The Ethernet cable from the spectrometer workstation to the LAN.

2. The SBS connection to the HDU(s).

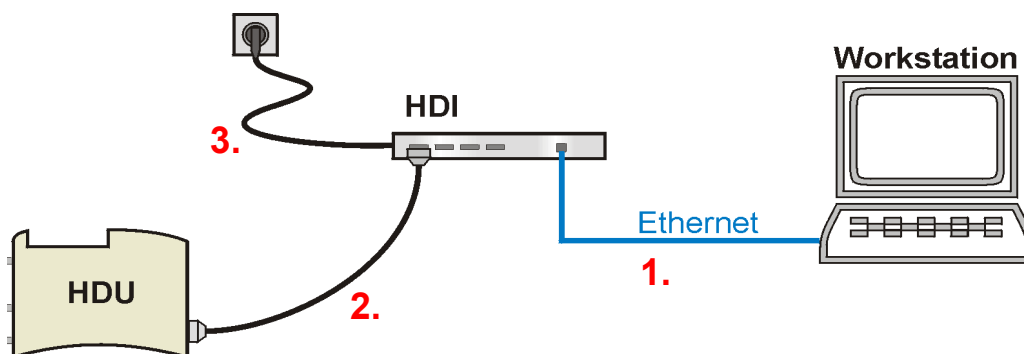3. The mains cable. Note: **Plugging this cable in will switch the HDI on**!

Figure 6.1. Typical HDI Connections

Wiring the HDU 6.3

You can connect up to 8 components to one HDU, and up to 4 HDU's to one HDI. There are two housing variants for the HDU:

- The **HPPR** housing is used if the HDU is placed in the vicinity a magnet.

- The **19"** housing is used if the HDU is placed in a cabinet.

Use the SBS interface cable to connect the HDI ports (labeled PORT 1 - PORT 4) to the HDU RS 485 terminal.

The terminal for an external power supply (labeled EXT. PWR) is not commonly used, rather power for the HDU is supplied from the HDI via the SBS interface cable.

Connect any external components to the terminals (labeled 1 - 8) on the front side of the unit.
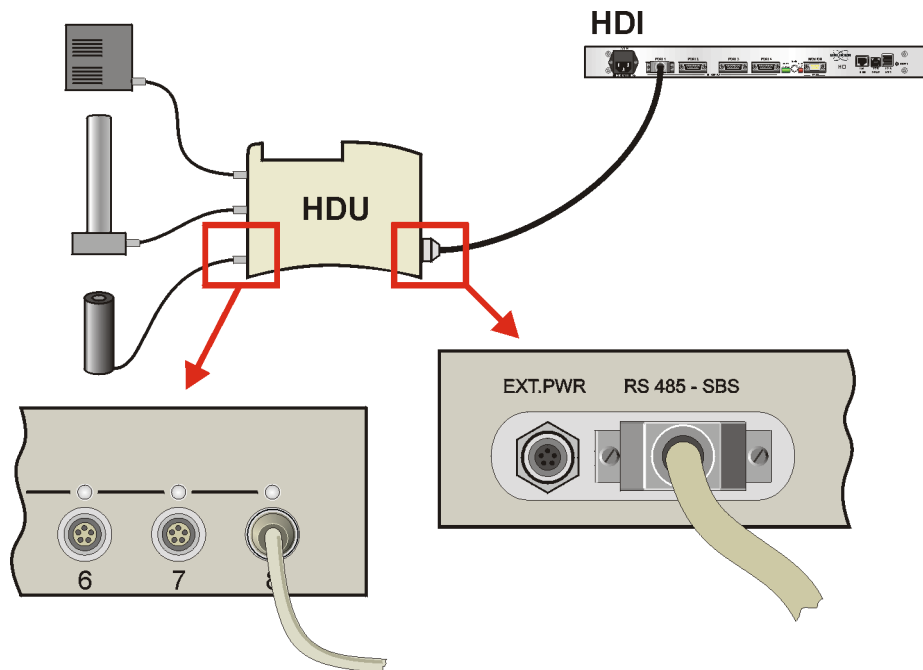
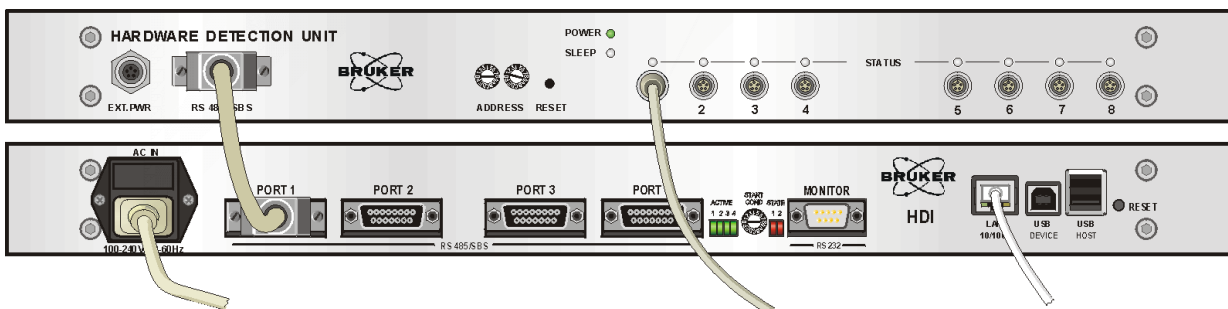*Figure 6.2.   HDU in HPPR Housing -Typical Installation*

Figure 6.3.   HDU in 19" Housing - Typical Installation

Initial Settings *6.4*

The following initial settings must be made before using the device:

SBS Bus Speed *6.4.1*

The SBS bus speed must be set both on the HDI and on the HDU(s). Be sure that both baud rate settings (HDI and HDU) are the same, otherwise communication will fail.

Use a small screwdriver to set the HDI's bus speed on the rotary switch labeled START COND on the front side of the unit.

The HDI supports the following bus speeds:

0:      9600 Baud
1:      19200 Baud
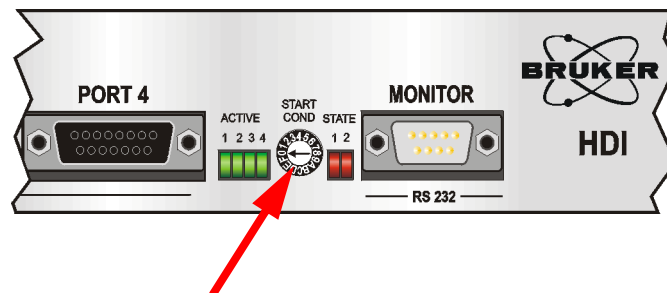2:   38400 Baud
3:      57600 Baud

Figure 6.4.   Setting Bus Speed on the HDI

To set the bus speed on the HDU, you have to remove the cover of the HDU. Use a small screwdriver to set the HDU's bus speed on the rotary switch labeled SW1 BUS BITRATE SBS (see the figure below).
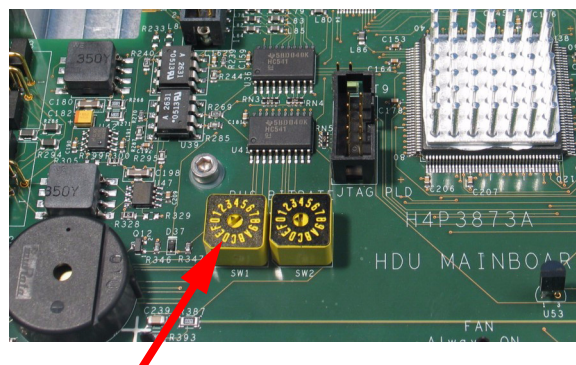

Figure 6.5.   Setting SBS Bus Speed on the HDU

The HDU supports the following bus speeds:

0:      9600 Baud
1:      19200 Baud
2:      38400 Baud
3:      57600 Baud

If the bus speed is changed during operation, the HDI and the HDU have to be reset before the changes are accepted.

Slave Address of the HDU   *6.4.2*

Use a small screwdriver to set the HDU's address on the rotary switches on the rear side (or on the front side of the 19" housing) of the unit. The address is in hexadecimal format, the left switch for the upper 4 bits, the right switch for the lower 4 bits. For example address 04 looks like the example in the following figure:
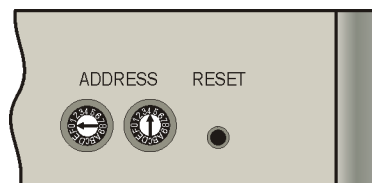

Figure 6.6.   HDU's Address Settings

Standard address settings:

HDU on Port 1:   01
HDU on Port 2:   02
HDU on Port 3:   03
HDU on Port 4:   04

Every time you change the address you must press the RESET button in order for the change to take effect.

Switching the HDI On or Off   *6.5*

The HDI is intended for continuous use and therefore has no mains switch. To switch the HDI **on**, plug the mains cable into the mains supply (wall socket). Wait approximately 60 seconds until the HDI boots and the network settings are loaded.

As the unit boots, the LED's are first tested (all six LED's stay on for about 3 seconds).

To switch the HDI **off**, unplug the mains cable line from the wall socket.

Be sure that each HDU has a unique slave address if more than one HDU is connected to a HDI.

In Automatic Mode every HDU must have the same slave address as the HDI Port number it is connected to *(refer to **"Hex Switch Settings" on page 37** for more information)*.

Operating Instructions

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Power on the HDU 7.1

The HDU has no power switch and therefore it is always on when the mains cable is connected. To switch the HDU off you must disconnect the SBS - interface cable.

At the moment of power on, the power indicator (green) lights up, the sleep mode indicator (blue) and the indicator lights (orange) flash shortly, and the HDU beeps once.

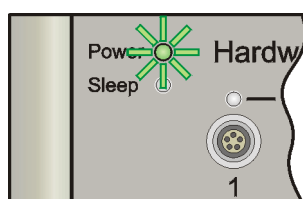When the HDU is on, the green power indicator will illuminate.

Figure 7.1. The HDU Power On Indicator

Connecting/Unconnecting External Components 7.2

You can plug the cable from an external component into any of the 8 terminals. The corresponding status indicator will show the actual status:

Green light illuminated:
The external component was detected, the BIS information read, and the component is ready for use.

Orange light flashing:
The external component was detected, the BIS information is being read (or written, or erased depending on the current operation).

Orange light illuminated:
The external component was detected but the component is not ready to use or it is in special state (e.g. standby, error, etc.).

Red light illuminated:
Error, usually wrong contact, cable broken or short circuit. The HDU sends an error code to the workstation. Please refer to the TopSpin/Paravision documentation for a detailed description.

Light off:
No external component was detected.

Sleep Mode   7.3

Due to the negative influence of electromagnetic interference (EMI) during measurements is necessary to switch off all sources of disturbance in the HDU. This is done by placing the HDU in 'Sleep' mode from the Paravision or TopSpin software when the measurement starts.

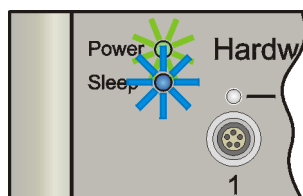The 'Sleep' mode is indicated with a blue light on the HDU.

Figure 7.2.   The HDU in Sleep Mode

The functionality of the HDU is limited while in sleep mode:

- The HDU cannot communicate with the HDI.

- The HDU cannot read, write, or erase BIS information.

- The HDU cannot detect changes (disconnecting of a component or state changes) on masked channels (see **_"Channels Masking"_**).

Leaving Sleep Mode   7.3.1

There are several ways to leave Sleep mode:

- By initiating a „wake-up" using the Paravision or TopSpin software.

- Through a component change on a non-masked channel (connecting, disconnecting, or state change).

- By pushing the reset button.

- By disconnecting and connecting of the SBS-Interface or power cable.

Channels Masking   7.3.2

When there are components connected to the HDU whose function is irrelevant for the current measurement and whose state changes or where disconnection may cause an undesirable wake-up of the HDU (and thereby EMI) from Sleep mode, it is possible to mask these channels.

The channel masking is performed using the TopSpin or Paravision software.

When the channel is masked (which makes the channel irrelevant for measurement), the HDU will not wake-up when disconnecting/reconnecting the component, or with a change in the state of the component.

All unconnected channels are set to not-masked (thus relevant for the measurement) the moment the HDU is switched to sleep mode. Connecting any component into this channel while in Sleep mode will cause a wake-up of the HDU.

Firmware Update

8

HDI Update via Web Browser

8.1

It is possible to update the firmware for the HDI units via a standard web browser. Before starting the update, the IP Address of the HDI must be known. To update the Firmware, the following steps need to be performed:

1. Enter a string like the one in the following example using the IP Address from the HDI in the address field of the browser.

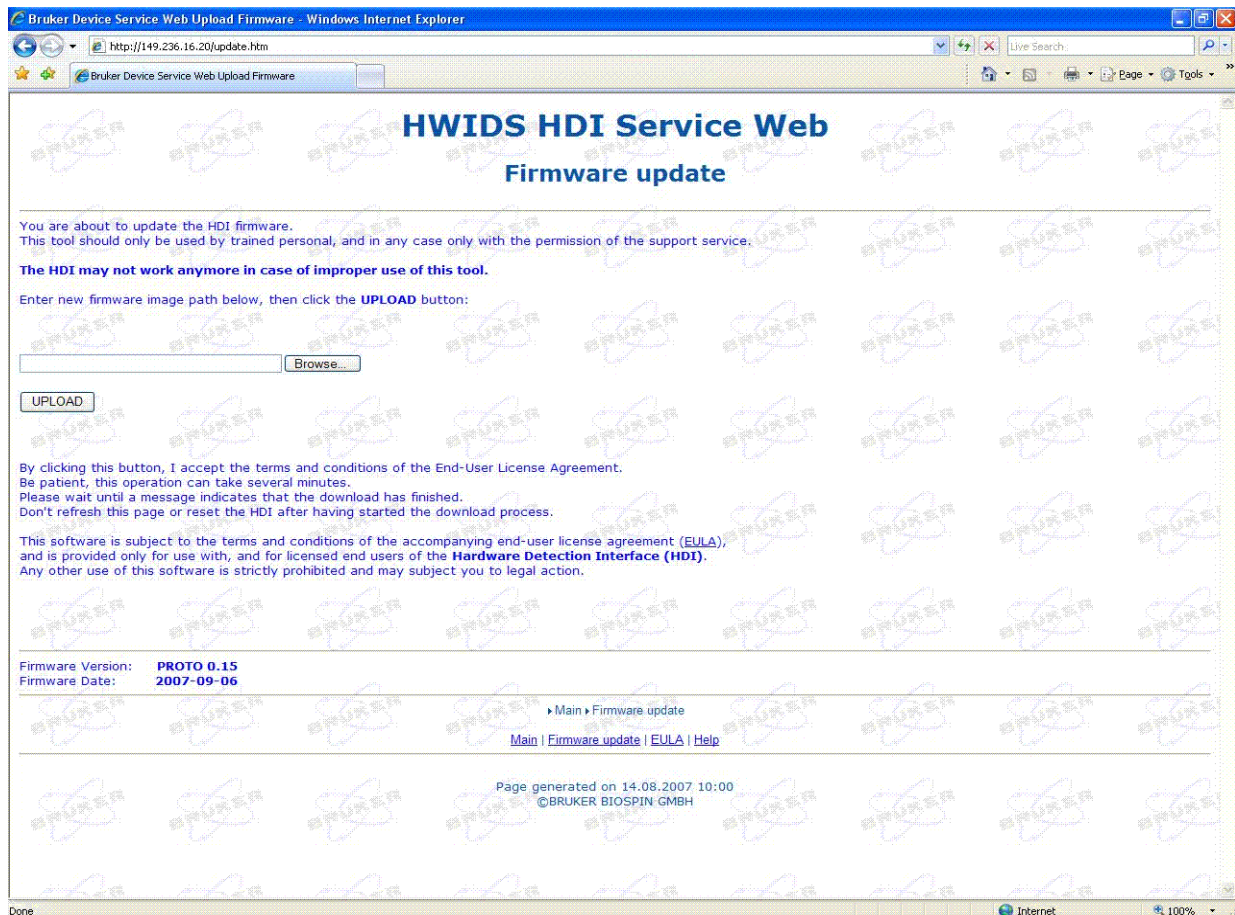   http://*149.236.16.20*/update.htm

The following window should appear:

Figure 8.1.   Firmware Update View 1

2. Click the „Browse..." button and select the corresponding file. An acceptable file name consists of the unit code (HDI), the firmware date, and the extension „.bin". For example:

HDI_20070815.bin

After selecting the file and confirming by pressing the „OK" button, the following window should appear:
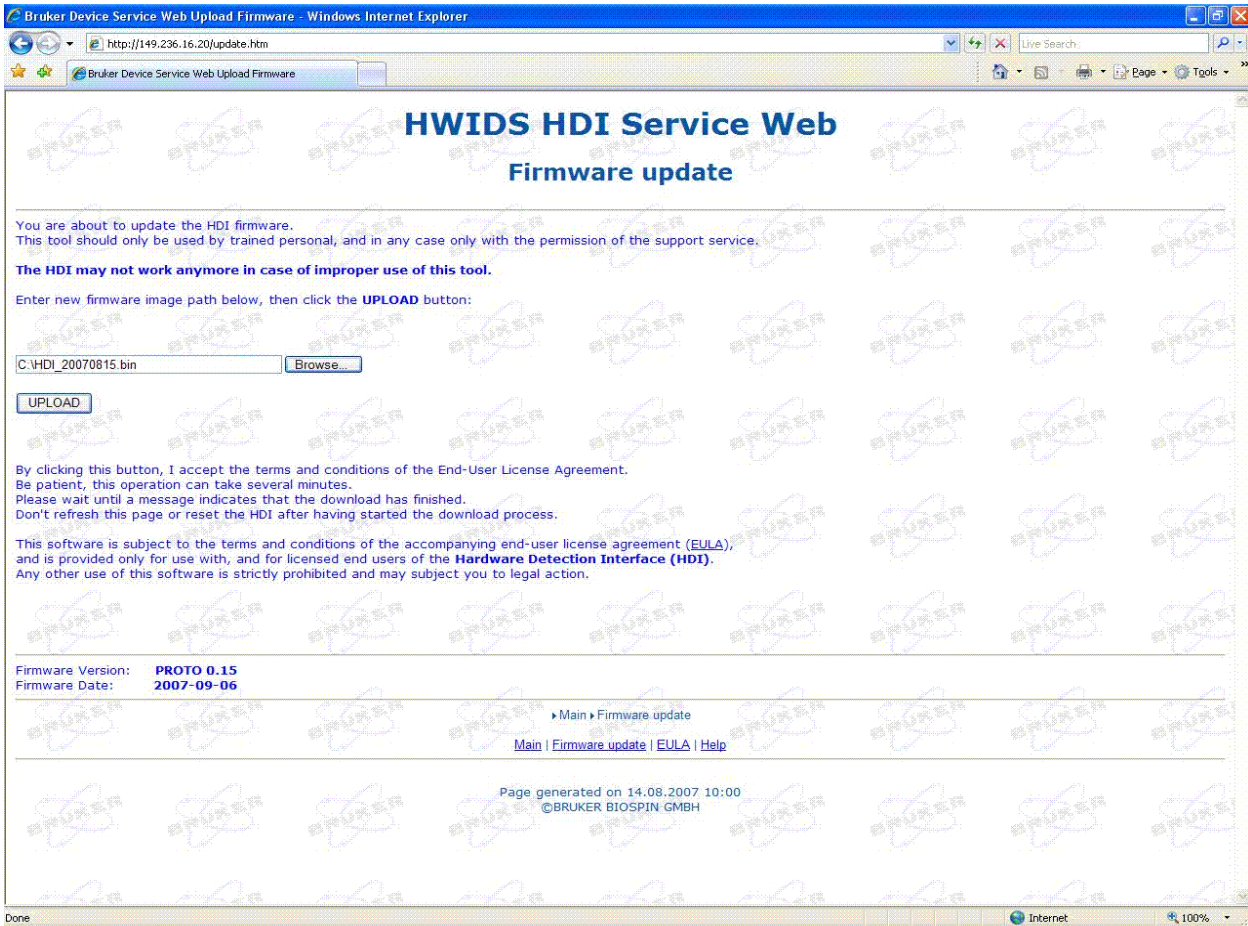

Figure 8.2.   Firmware Update View 2

3. The third and last step is to click on the „UPLOAD" button. This step implements the uploading process and may take several minutes. When the firmware update is successful, the following view will appear:
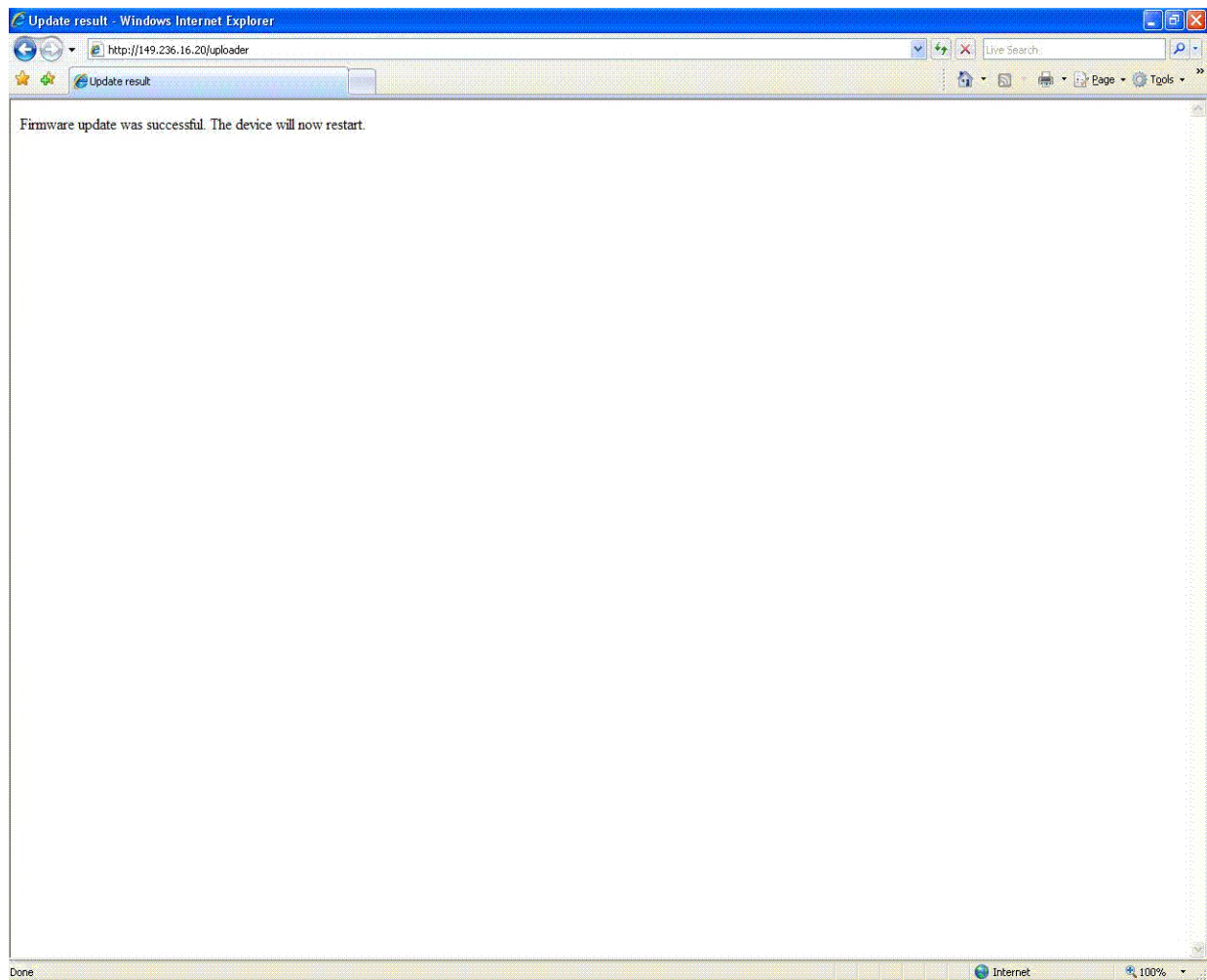
Figure 8.3.   Firmware Update View 3

If the download **fails**, an error message with the appropriate error code will be displayed. In this case repeat the upload process. If an error message still occurs, unplug the HDU's and try once again. If the download still does not work contact your nearest Bruker service representative.

HDU Update via Ethernet *8.2*

The HWIDS unit firmware can be updated via the HDI unit. If this should be necessary the most recent firmware version, together with any tool required to carry out the update, will be supplied by Bruker support.

Firmware Update

Troubleshooting

9

Introduction 9.1

This chapter contains functionality tests and information that will aid you in troubleshooting the HDI in case the unit is not operating correctly.

Please refer to section *4.5.1* for the location of the various buttons, LED's etc. mentioned in the chapter.

Testing the Status of the HDI 9.1.1

To check if the HDI is operating, type in the IP address of the HDI in the address field of a web browser, e.g. http://*149.236.16.20*/

If the HDI is working correctly, the following window should appear:
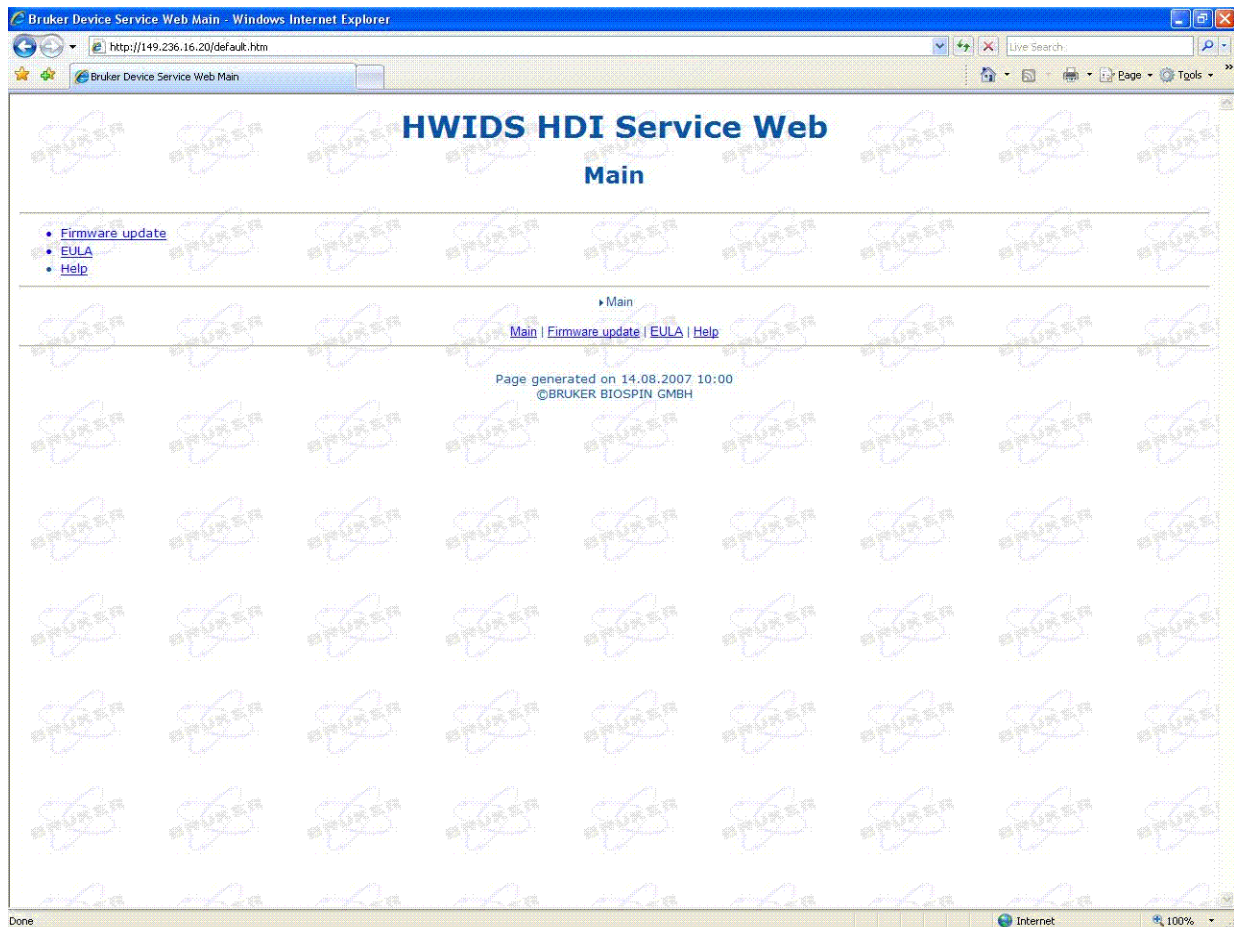

Figure 9.1.   The HDI Web Interface

Troubleshooting

Testing Ethernet Connectivity 9.1.2

The Ethernet Connection LED will illuminate when the connection is active. Likewise, the Ethernet Traffic LED will blink when data is being transferred over the LAN connection.

It is also possible to „PING" the device to check if the HDI is connected to the network.

Testing the Boot Sequence 9.1.3

For troubleshooting purposes, it is possible to check if the HDI is booting accurately by pressing the RESET button. When the unit is reset a series of self-tests will be carried out. A successful boot has occured when both of the error LED's flash for about three seconds. If the LED's do not flash as mentioned, one or more errors has occured whereas you should contact your Bruker service representative.

Warning: This test should only be carried out as a last resort as any active NMR measurements may be disturbed!

Monitoring the HDI with a PC 9.1.4

In order to monitor what the HDI is doing at any given moment, the unit can be connected to a PC. The connection is made using a standart serial cable between the monitor port of the HDI and the serial (COM) port of the PC.

The terminal settings for this port are:

- 115200 baud.
- 8 data bits.
- No parity.
- 1 stop bit.
- No handshake.

The HDI can then be monitored using a terminal program on the PC. The following figures contain typical messages received from the HDI monitor port.

The HDI after the boot sequence:

Figure 9.2.   HDI After Boot Sequence

When memory number 1 is removed and EEPROM number 3 is added to the HDU on channel 1, the output will be like that in the following figure:

Figure 9.3.   HDI During Normal Operation

Spare Parts *9.2*

If in the course of time some cables are missing or damaged, they can be reordered from Bruker. Here is a list of all cables needed for wiring the HDI. With the part numbers provided it is possible to order the respective cable from BRUKER customer service:

Power Cord (connection between the mains supply in the cabinet or the wall socket and the HDU):

81027- Power Cord, Cabinet, 1.0 meter

35929 - Power Cord, USA, 2.0 meters

3000 - Power Cord, Europe, 3.0 meters

Ethernet Cable (connection between the HDI and the ethernet switch/LAN):

83024 - 2.0 meters

83026 - 10.0 meters

Service Features *10*

The „Start Condition Switch", explained in section *4.5.1*. allows the HDI to start in several modes:

Automatic Mode - This is the standard operation mode for BRUKER spectrometer software, including TopSpin and ParaVision:

0: 9600 baud   (factory setting)
1: 19200 baud
2: 38400 baud
3: 57600 baud

The following baud rate is also available in automatic mode, but is too fast for communication with the HDU:

4: 115200 baud

Manual Mode - Operation mode for using the HWIDS without the BRUKER spectrometer software. For example for use with service, debugging or development tools:

5: 9600 baud
6: 19200 baud
7: 38400 baud
8: 57600 baud
9: 115200 baud   (to fast for HDU)

Service Mode - Operation Mode for service and debugging purposes:

A: 9600 baud   (UPnP Events and Port 1-4 disabled)
B: 9600 baud   (UPnP Events disabled)
C: 9600 baud   (Port 1-4 disabled)

Before updating the bootloader the folowing files must be availiable on the service PC:

- „Rom_Boot_for_NOR_Flash.bin" and
- „Eboot.nb0"

Be aware that if you update the bootloader, you also have to reinstall the Windows CE image. Otherwise the HDI cannot start the application firmware and thus will not function.

To update the bootloader you have to open the HDI case. Only qualified service personnel are allowed to open the HDI cover!

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, YOU MUST REMOVE THE MAINS POWER CORD BEFORE REMOVING THE COVER.

Static electricity can damage printed circuit boards and components inside the HDI. To prevent this from happening you need to protect against ESD, e.g. by wearing an anti-static bracelet.

To update the Bootloader of the HDI, the following steps must be performed:

1. The first thing to check is that the Jumper J3B is not inserted. This is the first Jumper behind the USB-A Connector on the CPU-A Board inside the HDI. JP3B is normally closed.

2. Connect the MONITOR Port of the HDI with the serial port on the service PC and open a Hyperterminal session with the following parameters:

   115000 Baud
   8 Data Bits
   1 Sop Bit
   No Parity
   No Handshake

   If the HDI is switched ON, the "C" character will be displayed several times in the hyperterminal window.

3. Use the transfer file function from the Hyperterminal application to transfer the "RomBoot_for_NOR_Flash.bin" file with XMODEM protocol.

4. Once the transfer is finished a new menu will appear in the Hyperterminal window.

5. Choose "Erase NOR Flash", wait for the end of the process and then "Download NOR Flash" and transfer your "Eboot.nb0" file using the same XMODEM protocol and transfer function from hyperterminal application.

6. Switch the HDI OFF and install the JP3 Jumper. Switch ON again and you in the Hyperterminal window will appear the Eboot menu. This allows the download of the Windows CE image in the NAND Flash and several other functions. The jumper should now remain at its place.

Terminal for External Components

Manufacturer: ODU
Type: Mini-Snap G50L0C-P05QF00-0000

PIN 1: Sense / +9V DC (I max 200 mA) *)
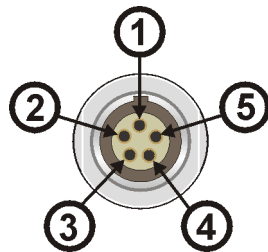PIN 2: Vcc +5V DC (Imax 75 mA)
PIN 3: Gnd
PIN 4: SDA
PIN 5: SCL

Figure 10.1. Terminal for External Components, Top View

*) Notie for pin 1: There is approx. 1.8 V (high Z output) on the sense pin if the terminal is left unconnected. If a PICS or ATMA module is connected to the terminal, there will be voltage +9 V switched on this pin.

External Power Supply Terminal

Manufacturer: Binder
Type: Series 712, 09-0416-55-05

PIN 1: Vcc IN +9V DC (I max 1.85 A)
PIN 2: Vcc IN +9V DC (I max 1.85 A)
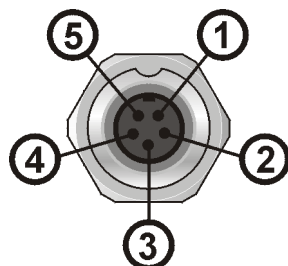PIN 3: Gnd
PIN 4: Gnd
PIN 5: Gnd

Figure 10.2. External Power Supply Terminal, Top View

The RS 485/SBS Terminal

Type: 15-pin MINI-D

Table 10.1.   The RS 485 Terminal

1		9	TX-
2	TX+	10	
3	Wake-up	11	RX-
4	RX+	12	
5		13	Vcc
6	GND	14	Vcc
7	GND	15	Vcc
8	GND		

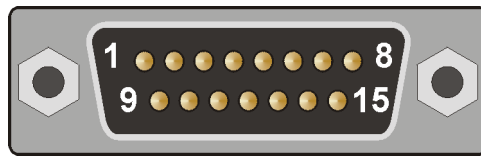*Figure 10.3. The RS 485/SBS Terminal*

Internal Connectors   10.2.2

Connector ST3, JTAG PSD

Type: 14-pin 4-wall header

1	TCK	2	GND
3	TMS	4	GND
5	TDO	6	GND
7	TDI	8	GND
9		10	
11	TSTAT	12	RST
13	TERR	14	VCC

If the PLD haven't been programmed yet, the PSD will be disabled (indicated by a blue LED "*Sleep*" on the front panel). To enable the PSD for programming, connect the W1 jumper. Don't forget to remove the jumper after programming.

Connector ST9, JTAG PLD

Type: 10-pin 4-wall header

1	TCK	2	GND
3	TMS	4	GND
5	TDO	6	GND
7	TDI	8	GND
9		10	Vcc *)

*) Connect the jumper W2 by connector ST9 when using the XILINX platform cable.

Use an adapter while programming through the "FlashLINK" or the "XILINX Platform Cable"! The programming dongles are not pin-compatible with the ST3 or ST9 connector.
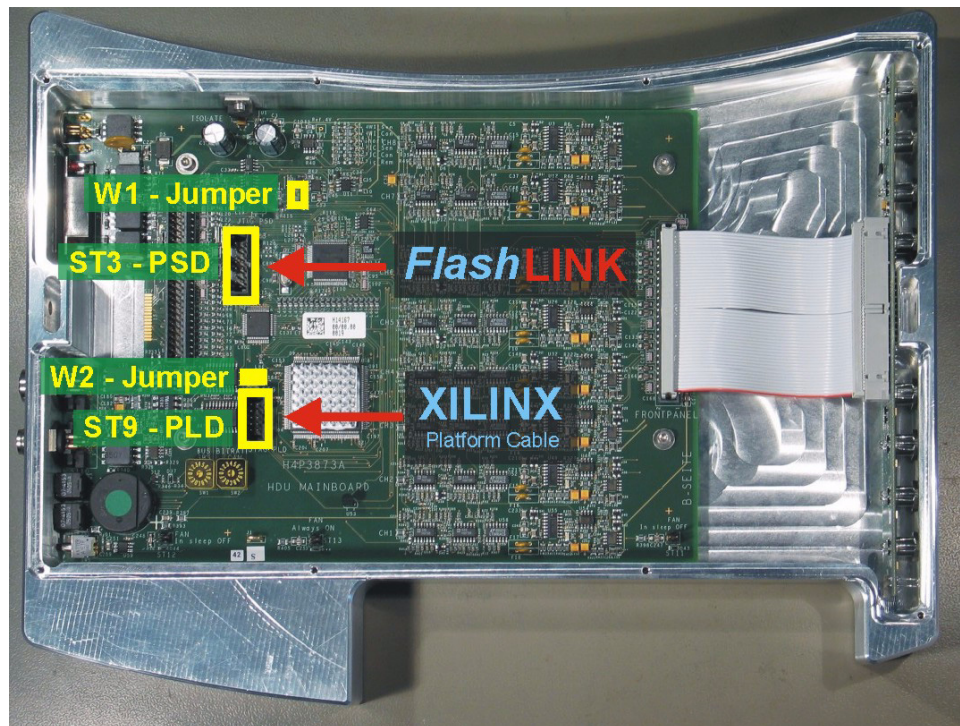

Figure 10.4. The ST3 and ST9 Connectors

HDU Slave Address Switches

The address is in hexadecimal format, the left switch for the upper 4 bits, the right switch for the lower 4 bits. For example, address 04 looks like this:
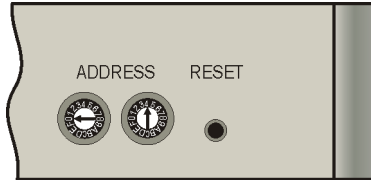

Figure 10.5. The HDU Address Settings

Standard address settings:

HDU on Port 1:   01
HDU on Port 2:   02
HDU on Port 3:   03
HDU on Port 4:   04

Every time you change the address you must press the RESET button in order for the change to take effect.
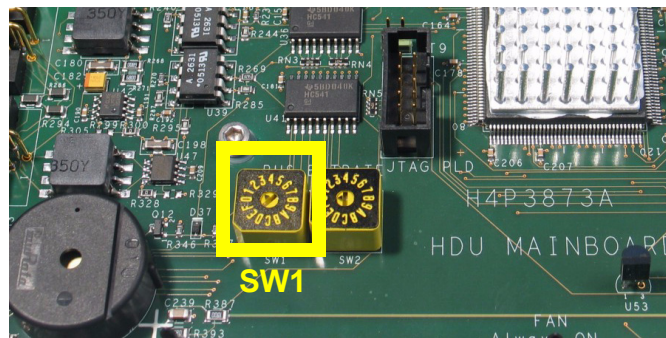
BUS Bitrate Switches

SW1 BUS BITRATE / SBS

Figure 10.6. Setting SBS Bus Speed on the HDU

The HDU supports the following bus speeds:

0:     9600 Baud
1:     19200 Baud
2:     38400 Baud
3:     57600 Baud

Wenn the HDU is in boot mode it is possible to download an application program. The HDU will always start in boot mode, checking if the application program is valid and then switches into application mode. If the application program isn't valid, the HDU will remain in boot mode.

To set the HDU into boot mode from the application program, send the SBS Command **HZZ** to the HDU.

In the SBS Terminal type: **"ZZ"** (with quotes). All LEDs on the front panel will illuminate to orange.

Do not enter the "ZZ" command more than once, as it will erase the application program from the FLASH memory!
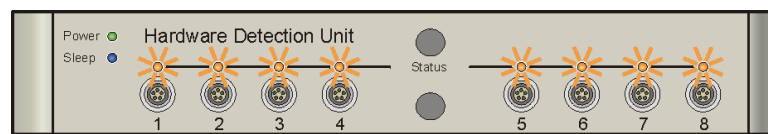

Figure 10.7. The HDU in Boot Mode

If the command ZZ doesn't work (e.g. application was wrong programmed) you can set the HDU to the boot mode manualy by the help of the HEX switch SW1 (Bus bitrate SBS), positions 8 – F. The LED 1 will illuminate red.
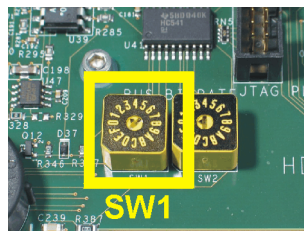

Figure 10.8. The SW 1 Hex Switch

Table 10.2.   The Bit Rate Setting in Boot Mode

Pos.	Bitrate
0 - 7	*Bit rate setting in applications mode*
8	9600
9	4800
A	9600
B	19200
C	38400
D	57600

The LED Function in Boot Mode

All LEDs are iluminating orange when the HDU enters boot mode. LEDs 1 – 4 have special functions:
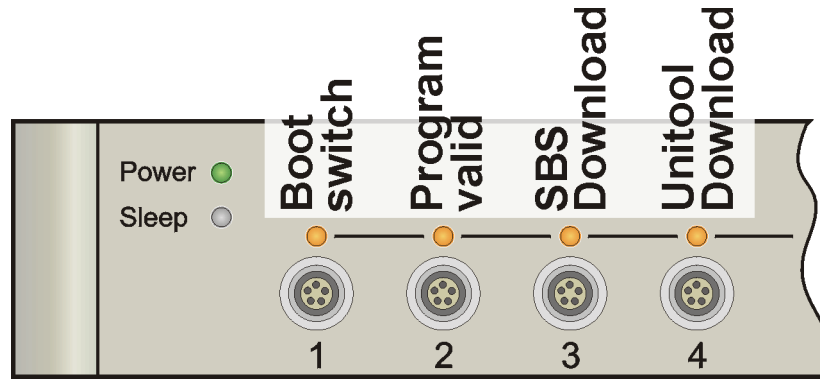

Figure 10.9. The HDU LED's in Boot Mode

Table 10.3.   The HDU LED Functions in Boot Mode

LED 1	Boot Switch	Orange: Red:	Boot switch (SW1) set to application mode (default) Boot switch set to boot mode
LED 2	Program Valid / Checking Program	Orange blinking: Orange: Red:	Checking the application program Application program is valid Application program isn't valid (wrong checksum, wrong program, etc.)
LED 3	SBS Download	Orange: Red: Green:	No download at time Erasing FLASH or download failed Downloading
LED 4	Unitool Download	Orange: Red: Green:	No download at time Erasing FLASH or download failed Downloading

Service Features

Product Data

11

Declaration of Conformity 11.1

The product herewith complies with the requirements of the following EMC Directive 2004/108/EEC (previously 89/336/EEC) and the Low Voltage Directive 2006/95/EEC (previously 73/23/EEC).

The Declaration of Conformity concerned with this product has been signed and is available from Bruker. If you require a copy of the original please contact your nearest Bruker BioSpin representative.

HDI Technical Data 11.2

Input Voltage:	AC: 100 - 240 V, single phase, variation max. +/- 10%.
Input Frequency:	50 - 60 Hz.
Current:	0.7A max. at 230V AC input, full load condition.
Power Consumption:	Full load: 85 VA.
Fuses:	2 x T250V~, 1.0 A.
Output Voltage:	DC: 9V.
Output Current:	DC: 0 - 8A.
Degree of Pollution:	2.
Over Voltage Category>	2.

HDI Dimensions 11.3

Height:	43.6 mm	(1 HU).
Width:	483 mm	(19").
Depth:	345 mm.	
Weight:	4.2 kg.	

Product Data

Input Voltage:	DC: 8 - 10 V.
Input Frequency:	DC ===.
Input Current:	Max. 1.6 A, full load (1.85 A PTC resetable fuse).
Power Consumption:	Max. 16 VA, full load.

Optional: External Power Supply (use only original Bruker HDU power supply)

Input Voltage:	DC: 8 - 10 V.
Input Frequency:	DC ===.
Input Current:	Max. 1.6 A, full load (1.85 A PTC resetable fuse).
Power Consumption:	Max. 16 VA, full load.

For HWIDS components (MPM or MUM boards) connected:

Output Voltage:	DC: 5 V.
Output Current:	DC: max. 100 mA per channel (100 mA PTC resetable fuse), current over 75 mA is indicated as "High Current Error".

For PICS or ATMA components connected:

Output Voltage:	DC: 8 - 10 V.
Output Current:	DC: max. 200 mA per channel (200 mA PTC resetable fuse).

It is only allowed to connect a maximal of one ATMA component per HDU.

HDU in HPPR/2 housing:

- Dimensions:	270 x 350 x 40 mm.
- Weight:	3.1 kg.

HDU in 19" housing

- Dimensions:	483 x 345 x 43.6 mm (1HU).
- Weight:	2.5 kg.

Operating Environment *11.6*

Altitude:	Maximum 2000 m.
Temperature:	5 ~ 40 °C.
Air humidity:	Maximum 80% for temperatures up to 31 °C, linearly decreasing to 50% humidity at 40 °C.
Storage:	5 ~ 40 °C.
	Air humidity maximum 80% for temperatures up to 31 °C, linearly decreasing to 50% humidity at 40 °C.

Care and Maintenance *11.7*

The HDU should be treated with care:

- Protect the HD from moisture and humidity.

- Do not store the HDU in dusty, dirty areas.

- Do not store the HDU in hot areas. High temperatures can shorten the life of electronic devices.

- Do not drop, knock or shake the HDU. Rough handling can damage components inside the device.

Cleaning *11.8*

Clean the device according to following instructions.

1. Unplug the SBS-interface cable and power cable.

2. Wipe the case with a dry or damp cloth.

Do not use harsh chemicals, cleaning solvents, or strong detergents to clean the device.

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3. Let the device completely dry before you plug in the power cord.

Product Data

Figures

Figures

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Notes:

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