Littfinski DatenTechnik (LDT)

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Command Codes for

High Speed Interface-88-USB (HSI-88-USB)

(Firmware from version 0.71)

(Software-version 1.2)

Brief description:

The **HSI-88-USB** is an **interface** for the transmittance from the **s88-feedback bus** to the **Universal Serial Bus (USB) of the PC**.

The interface contains **three s88-bus plugs**. This provides the **advantage** of a **faster response time** and the possibility to build-up **three bus lines** on the layout-system.

The three plugs are named as **left, middle** and **right bus-plug**. It is possible to control **max. 31*16 feedback contacts**. Each bus-line controls max. **31*16** contacts but as **summary not more as 31*16** contacts can be read.

There will be always **16 feedback inputs** combined into **one module**. The **module** with the **number 1** will be the **first module on the left bus line**. Up to the **last registered module** on the left bus line will be counted now upwards. Then it will be continue with the **first module** of the middle line. The module with the highest module number will be the last module on the right line.

The **HSI-88-USB** has been equipped with an **USB 1.1/2.0 Full-Speed-Connection**.

Installation:

The **HSI-88-USB** will be **automatically recognized** by the system after plug-in into an **available USB port**. The **HSI-88-USB** is an **integrated unit** (**HSI-88-USB** and **DiCoStation**). Therefore will be **two USB units** recognized in series. At first the "**DiCoStation-USB**" and then the "**HSI-88-USB**". It is required to **install always both software driver**.

You can download those from our Web-Site at the section
"Downloads / High-Speed-Interface HSI-88-USB for the s88-feedback bus"
(https://www.ldt-infocenter.com/dokuwiki/doku.php?id=en:dl_hsi_88_usb).
Presently the following **operating systems** will be **supported**:

- **Windows 10 (32- and 64-Bit)**
- **Windows 8 (32- and 64-Bit)**
- **Windows 7 (32- and 64-Bit)**
- **Windows Vista (32- and 64-Bit)**
- **Windows XP**
- **Windows 2K**
- **Windows ME**
- **Windows 98**

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Set-up of the communication connection:

The **connection to the unit** will be applied as by opening an ordinary **file**. Therefore will be the **communication** via **all common programming tools** possible. It has been tested with **Microsoft C++** and **Java**.

There is a **special unit identification** required as similar to a serial interface. This name will be not "COM1" but **.\HsiUsb1.** The two backlashes, the dot and the third backlash will indicate the unit-name. "**HsiUsb"** will identify the **unit software driver** and "**1**" will be the **unit number**.

The **reading** and **writing** will be carried out as per **common file options.** A **synchronous** as well as an **asynchronous** transmittance will be supported.

If there will be **several HSI-88-USB** connected to an **USB** port, the connected units will be **numbered by the unit software driver**.
The **first connected HSI-88-USB** will receive the **number 1**. The second will receive the number 2 etc.
The **HSI-88-USB** will **remember** this **registration number** even after switching off the system. If at a later time e.g. only unit 2 will be connected this unit will be identified under the name "\\.\HsiUsb2" even if the unit 1 will be presently not be connected. This assures which concrete **HSI-88-USB** will be contacted.

It will be within to option of the developer of the control-program if or not **several HSI-88-USB** shall be supported at the same time. The **highest theoretical possible unit number** will be **255**.

Service Tools:

The **unit number** of a particular **HSI-88-USB** can be afterwards changed with the **Service Tool** "**DiCoStationHSI-88.exe**". This **service tool** can be found as well on our Web-Site at the section "Downloads / High-Speed-Interface HSI-88-USB for the s88-feedback bus " (https://www.ldt-infocenter.com/dokuwiki/doku.php?id=en:dl_hsi_88_usb) and contains the following possibilities:

- Changing the **unit number** of a **HSI-88-USB** or a **DiCoStation**.
- **Information Area** about **Firmware**- and **Driver-Versions**.
- **Up-date Area** for the possibility to update the **HSI-88-USB** and the **DiCoStation** with actually **Firmware**.
- **HSI-88 Terminal** for **direct communication** with the **HSI-88-USB** using the commands described within this instruction.

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<u>Differences to the serial Version:</u>

The **instruction address complies** to the **serial version** and therefore to the address of the **HSI-88** for **the RS-232 interface**. Therefore should be the adaption of the **HSI-88-USB** easily possible.

There are only the **following variations**:

- Different unit names (see above)
- The command "**v**" will return a variable length. It is recommended to request the single signs until receiving the <CR>. Maximum length is 255.

<u>Command structure:</u>

There will be **commands** and **data** transmitted. The **last character** of each command is **carriage return**.

Is the **TerminalMode switched off** there will be **unsigned hex-bytes** transmitted (one value equals to one byte). Is the **TerminalMode switched on** there will be **ASCII-characters** (one value = two bytes), transmitted as hexadecimal values.

<u>TerminalMode:</u>

Command format: "**t**"   <CR>

Command length: 2 byte

Response: "**t**"   <on ("**1**") or off ("**0**")>
                            <CR>

Response length: 3 byte

After the **start** is the **TerminalMode switched** to **off**. With "**t**" it can be switched **on** to **communicate** e.g. with help of the **Servicetool "DiCoStation HSI-88.exe** via a **keyboard** and **screen** with the **HSI-88-USB**.

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Initialization / Register the feedback module:

Command format:	"**s**"	\<number of modules left\>
		\<number of modules middle\>
		\<number of modules right\>
		\<CR\>

Is the maximum number of modules of 31 exceeded there will be the standard value adjusted (2 modules each line).

Command length:	TerminalMode **off**:	5 byte
	TerminalMode **on**:	8 byte

1. Response:	"**s**"	\<total number of registered modules\>
		\<CR\>

The input condition of the registered modules will be read between the 1. and the 2. response.

2. Response:	"**i**"	\<number of modules to be registered\>
		\<module number\> \<HighByte\> \<LowByte\>
		\<module number\> \<HighByte\> \<LowByte\>
		\<module number\> \<HighByte\> \<LowByte\>
		\<CR\>

Response length:	TerminalMode **off**:	(6 + (number of modules) * 3) byte
	TerminalMode **on**:	(8 + (number of modules) * 6) byte

By the 2. response will be the contents of **all** registered modules transferred.

The module number can be dynamically changed during the program flow by using the "s" command.
After switching-on the interface all input changes of the feedback modules (over "**i**") will be registered beginning after the first "s" command.

HSI-88-USB reports changes:

Response: "**i**"   \<number of registered modules\>
                          \<module number\> \<HighByte\> \<LowByte\>
                          \<module number\> \<HighByte\> \<LowByte\>

                          \<module number\> \<HighByte\> \<LowByte\>
                          \<CR\>

Response length: TerminalMode **off**:   (3 + (number of modules) * 3) byte
                    TerminalMode **on**:   (4 + (number of modules) * 6) byte

Only the content of modules with **changed** input conditions will be transmitted.

PC query of input conditions:

Command format: "**m**"   \<CR\>

Command length: 2 byte

Response: "**m**"   \<number of registered modules\>
                          \<module number\> \<HighByte\> \<LowByte\>
                          \<module number\> \<HighByte\> \<LowByte\>

                          \<module number\> \<HighByte\> \<LowByte\>
                          \<CR\>

Response length: TerminalMode **off**:   (3 + (number of modules) * 3) Byte
                    TerminalMode **on**:   (4 + (number of modules) * 6) byte

The content of **all** registered modules will be transmitted.

Version inquiry:

Command format:	"**v**" \<CR\>
Command length:	2 byte
Response:	"V.x.xx / HSI-88-USB / y.yy Win XP / (c) 2007 LDT & Falkner" \<CR\>
Response length:	variable
	It is recommended to request the single signs until the \<CR\>. The maximum response length is 255.
Meaning:	x.xx is the Firmware-Version of the HSI-88-USB y.yy is the USB-Software–Driver-Version within the request sample for Windows XP.