Heally

Software-
Description - 2

Date: March 2005

HealthLab – Heally

Inhalt

1   Heally Control - Overview

The program HEALLY enables the use of the physiological Monitoring-System Healthlab.

The following basic functions are realized:

- Measurements may be started, stopped and programmed
- Configuration of program-processes, protocols and channels
- Data may be visualized online (graphical and alphanumeric)
- Configuration of data display
- Reading and converting of data
- Queries on status for Master, Satellites and Measure Channels
- Update of firmware in Master and Satellites

1.1   General description of main window
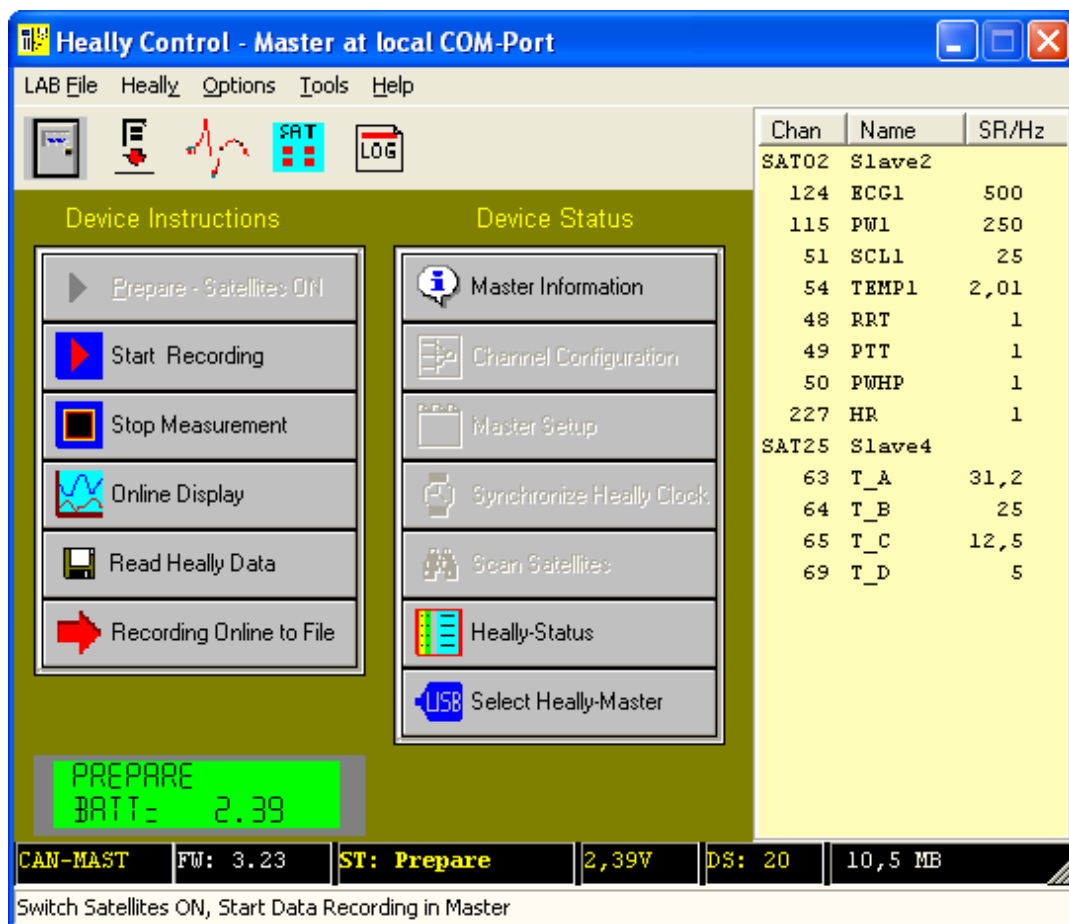
Menu Bar
The menu bar ist descriped in chapter 3.

Toolbar

Different functions will be executed by clicking on the following icons.

A click on this icon opens a dialog to close the program.

A click on this icon opens a dialog to start the program HLLabExport (see description HLLabExport).

A click on this icon opens the window HLExplorer (see description HLExplorer).

This icon becomes active after starting the satellites by clicking the button *Prepare Satellites ON* in the left menu bar (see 2.1.1). Afterwards the dialog *Satellite Command* will be opened.

A click on this icon opens the dialog *Messages in Log File* (see 3.3.2)

Device Instructions

In this panel you find main functions for steering the Healthlab-Hardware of the HEALLY-program. You may configure the Healthlab, start queries on status information and read data that are gathered by the master. For the description of each function see 3.2.1.

Device Status

Functions within this panel show status and enable configurations. For the description of each function see 3.2.1.

Right hand part of window

A list of Satellites acknowledged by the master is shown in the left column *Chan*. The middle column *Name* shows the channel names. The right column *SR/HZ* states the sampling rate of the channel. Should the channel be shutdown in the *Master-Setu*p the word *OFF* occurs instead of the sampling rate. Should the channel be shutdown within the *Channel Configuration* (sample rate is setted on 0) it is not displayed any longer. Should the satellite be shutdown in the *Master-Setup* with *Standby* the channels of the satellite will be hidden. See *Master Setup 2.2.3.*

Green Display field
In the light green field information about the status are shown depending on the status of the master. In addition date and time are displayed.

Note: A click on this display updates the status information of the program window (an automatical update happens every second).

Lower status bar
In the lower part of the main window there are to status bars.
Upper status bar
This bar refers to the communication with the Healthlab. It shows the information described below from left to right.

Mastername
The name of the master is shown, provided that it was connected when starting the Heally-program.

Firmware Release (FW)
Shows the present program version.

Status (ST)
States the present configuration of the master as well as temporary status (e. g. finish = end of recording) and error messages.

The most important status:

Main
Basic status, satellites off.

Prepare
Satellites on. Data are transferred to master.

Recording
Same as *Prepare* plus saving of data within the master.

Clock Wait
Master is in waiting position until the beginning of the measurement.

Sat Config
Special mode for the channel configuration within the satellites (see *Channel Configuration 2.2.2*.

Volt
Shows battery voltage.

DS
Number of data records (DS)

.. MB
Free memory within the Master in MByte.

Status bar at the bottom
Shows help text referring to the present menu item. Therefore the mouse cursor needs to point on the desired menu item.

2   Buttons of the main window

Which buttons are free to be used depend on the context. During the preparation (*Prepare*) as well as during measurements only certain master commands may be executed (commands that might affect measurements are out of use). In some cases a confirmation is needed or the measurement needs to be stoped first. During basic condition all satellites are off and the button *Stop Measurement* is not active.

If only the button *Select Heally-Master* is active, there is no connection to the master.

If the display looks at random a measurement program has been acitvated within the master. During the work on instructions the left panel is not active.

2.1.1   Prepare-Satellites ON

Prepares the master for a measurement (*Prepare-Mode*), satellites will be started and configured. During the preparation as well as during measurements only certain master commands may be executed (commands that might affect measurements are out of use).

2.1.2   Start Recording

A click on this button starts satellites and the master is put into measure mode.

2.1.3   Stop-Measurement

Stops the measurement and switches satellites off.

2.1.4   Online Display

Online-Display of channel data. The master switches the satellites on and is now in „online"-mode. This display may also be shown during recording of data within the master.

2.1.5 Read Heally Data
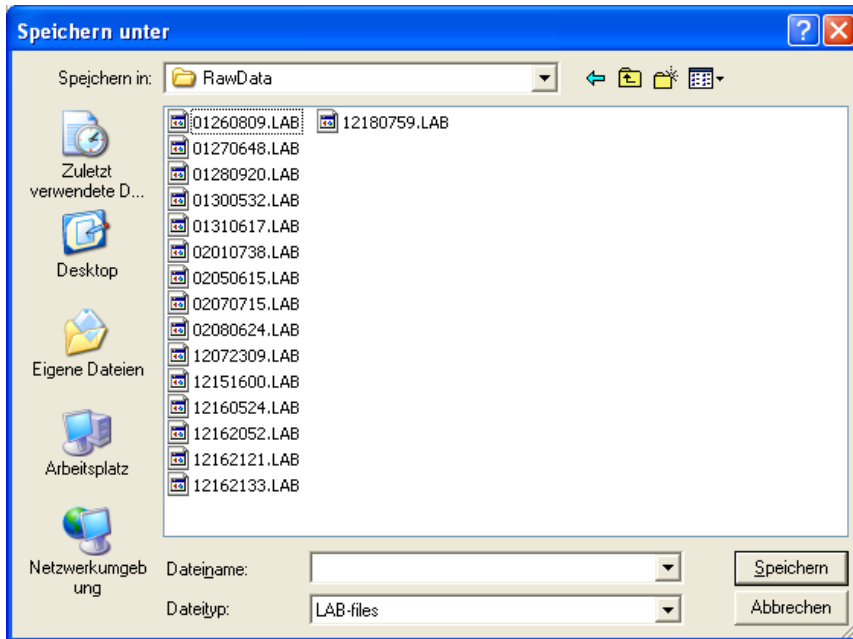
Reads data from the master to store them in a *RAWDATA* directory. Therefore a data name needs to be written within the right directory. The extension is *.lab*.

After storage and automatic conversion into DOX-file the program states the data that have been generated.

Only one (*LAB-)*file is generated although more than one data records are included, but for each data record one *DOX-file* is generated. If the reading of the data is finished, they will be deleted within the Master if answering YES to the question *Erase Data in Master?* Deleting of the internal memory is also possible via *Heally→Configuration→Erase Data in Heally-Master* möglich.

2.1.6 Recording Online to File

This button allows direct storage of recorded data during measurement – only if *Prepare Mode* has been started (see 2.1.1). When starting for the first time, the file name has to be chosen.

2.2 Device Status
Functions within this panel show status and enable configurations.

2.2.1 Master Information

```
Heally Control                          [X]

* CAN-MAST 3.23T 2004/1 Default

Total Flash Memory [KB]    :    16896
Free Flash Memory [KB]     :    10048
Max Entries of Phase table :      131
Number of Measurements     :       24
Serial Number              : 00023941
Software Ident             :     3.23
Battery Voltage [V]        :     2.37
Last Internal Error        :        0
Slave Address 02  : SAT02 (SAT02-R12-K2-V308B)
Slave Address 04  : SAT25 (SAT25-S02-K4-V306B)

              [   OK   ]
```
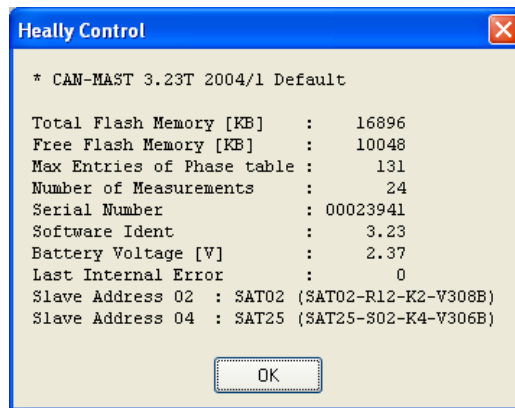
Shows the dialog in which the name of the master and channel configurations may be read. (Updates also the right window).

Total Flash Memory
States total memory of the Master in KByte.

Free Flash Memory
States available memory of the master for measuring data.

Max Entries of Phase Table
States the maximum number of entries of phase table.

Number of Measurements
Number of executed measurements.

Serial Number
Displays serial number.

Battery Voltage
Displays voltage of battery.

Last Internal Error
Shows number of last error – in case there was one.

Slave Address
States addresses of existing satellites.

2.2.2 Channel Configuration

The button *Channel Configuration* opens a dialog in which satellites are listed and may be selected. By clicking on *OK* a further dialog opens *(Modifiy Satellite Parameter)*. What is shown within this dialog depends on which satellites are selected and possible settings. The following picture shows an example.
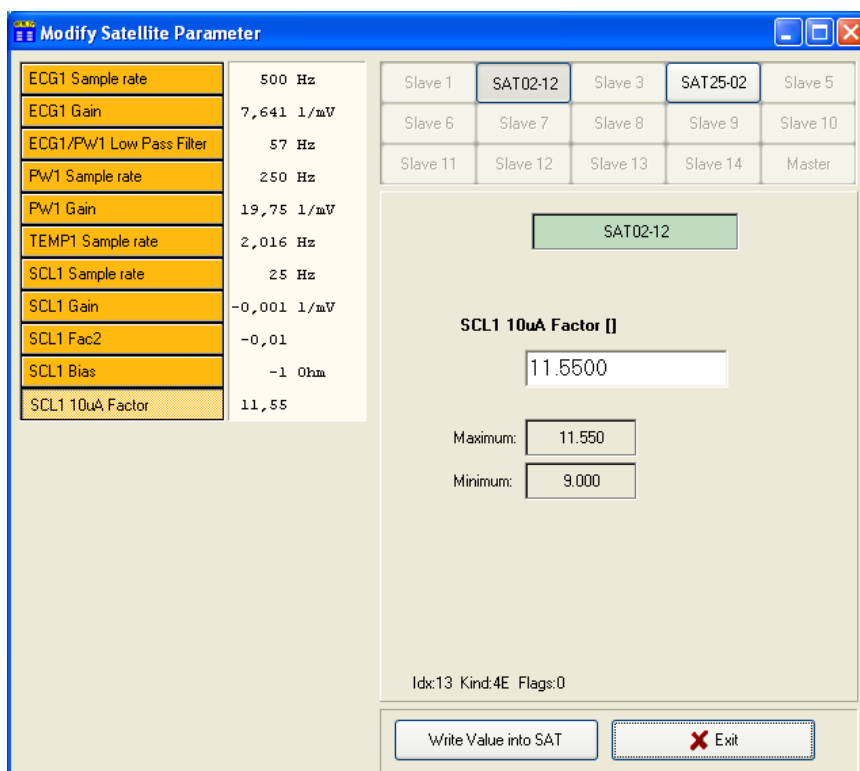
Depending on which button is chosen of the left column, details will be stated right referring to sampling rate, strength etc. To change a value the numbers in front and behind the comma may be selected and overwritten. The complete value may not be overwritten. By clicking on the left button *Write Value to Sat* the new value of the parameter will be registered within the Satellite and the old one is substituted. Otherwise the value will be automatically changed into the last saved one.

The desired satellites may be selected on the right top. The present selection is displayed in the green field underneath. There will also maximum and minimum values be stated referring to the respective parameter.

Exit
Closes the dialog.

2.2.3 Master Setup
Here the configuration of the running Healthlab-System is configurated. The communication with the master will be checked and the existing setup is read. It also enabels the starting and finishing.
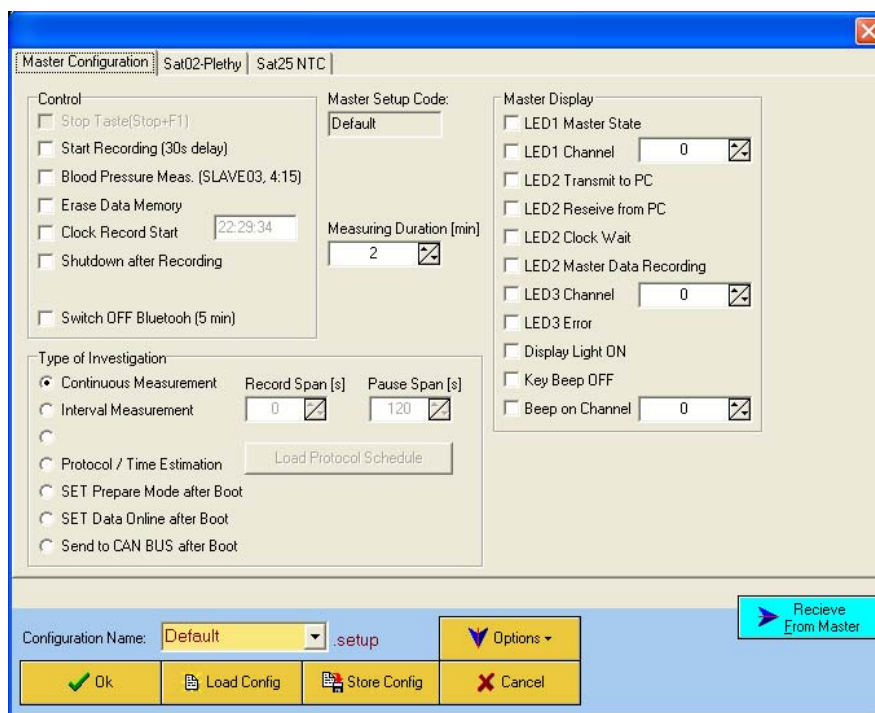
2.2.3.1 Register Card Master Configuration
This dialog enables the following functions: modification of the measurement program, the behaviour when turning on and off, default of an examination protocol, definition of time of measurement and duration, automatical start of measurements.

Control Options
Here the following options may be chosen:
> **Stop button [Stop+F1]**
>> The setting of a checkmark activates a safety device. To finish the measurement the pressing of two buttons is needed now: the *Stop* button and at the same time *F1* (only for H-Master with display and keybord). Usually the measurement may be finished only by the *Stop* button.

> **Blood Pressure Meas. [Slave03, 4:15]**
>> If a blood pressure appliance is connected an automatical blood pressure measurement is started about every five minutes.

> **Erase Data Memory**
>> The setting of a checkmark deletes all data within the master's memory.

Clock Record Start
Clock-Wait means that the Master is in waiting position until the time stated.
If this function is active a time may be stated at which the recording starts. After pressing the button *OK* the Master is in waiting position.

Shutdown after Recording
The master and the Satellites are switches of if this function has been activated by setting a checkmark.

Switch Off Bluetooth
If the PC connection is finished, the blootooth-chip switches off after about 5 minutes due to power saving reasons. (Only if master and bluetooth are connected via PC).

Program Flow
The following program-modes may be chosen:
Continous Measurement
Continously measurement

Interval Measurement
Measurement is recorded in intervalls. Duration of recording and breaks may be defined within the fields right hand side.

Protocol / Time Estimation
For the measurement a protocol is used, that is saved within the Master. This protocol needs to be provided as a file. It is loaded toghether with the Master. To load the file click the button: *Load Protocol Schedule.* A dialog opens to search for and open the file requested.

SET Prepare Mode after Boot
After booting the system the master is automatically put into *prepare mode.*

**SET Data Online after Boot**
After booting the system the Master is automatically put into *prepare mode* and data are sent to the PC port.

Send to CAN BUS after Boot
After booting the system the Master is automatically put into *prepare mode* and data are send via Bluetooth-port to the Bluetooth-CAN-Adapter.

Note: For the description of the lower button bar see documentation No. 1 HLCC.

2.2.3.2 Register Card for the Satellites
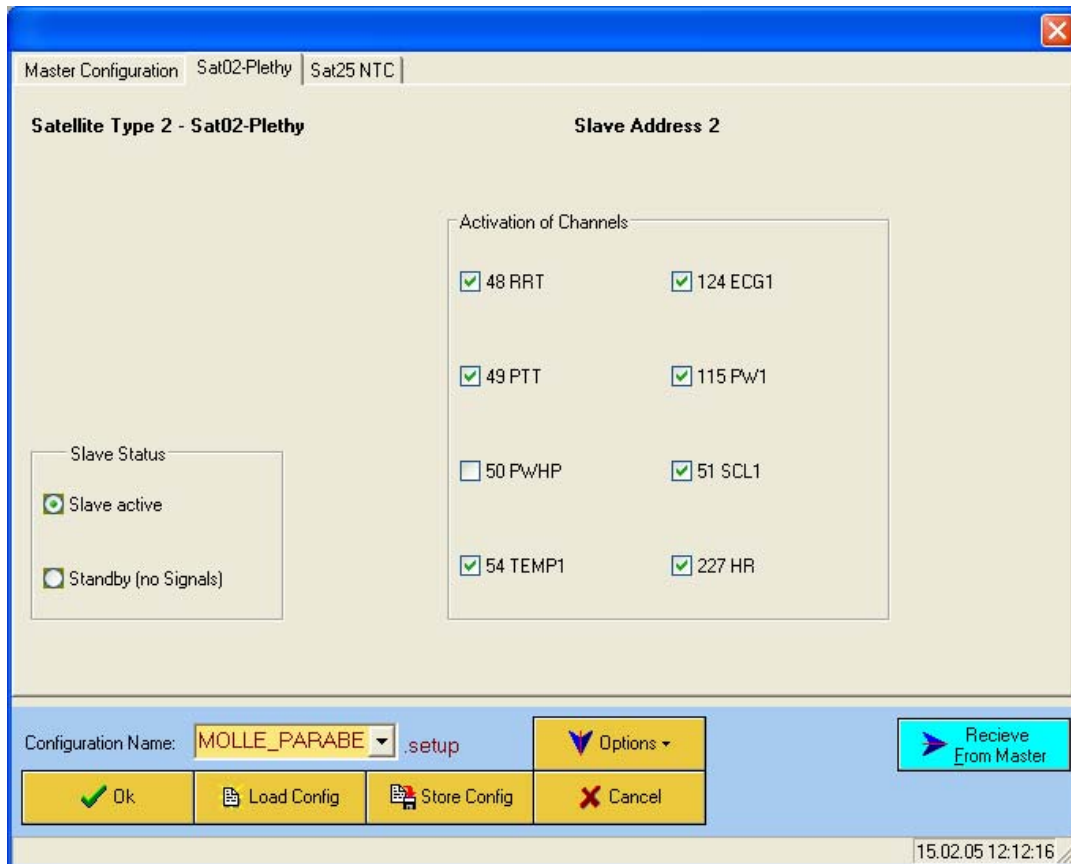
Slave Status
   Slave active
      This choice switches the satellite on.
   Standby
      This choice switches the satellite off.

Activation of Channels
Here the desired channels may be chosen and thus activated.

Note: For the description of the lower button bar see documentation No. 1 HLCC.

2.2.4 Synchronize Heally Clock

The actual PC-time is transferred to the Master. The Master uses this time as internal reference. With this time absolute times for the data measured may gathered and exported (see Export as **Data table 3.1.4**).

2.2.5 Scan Satellites

A click on this button tells the Master to search for satellites, find out about their status and collects all information belonging to them (*Satellite Descriptor*). This task is necessary after adding and/or exchanging satellites or updates of firmware.

2.2.6 Heally-Status

Displays the status of the master, the satellites and their channels. This includes:
- connected satellites
- RS485-Bus-Configuration (only relevant for test purposes)
- Supplypower of assembly groups (**Attention!** The voltage within the Master is the same as the battery-voltage of the whole system. It must be between 1.5 and 3.3 – it is stabilized up to 3.3. While the voltage of the satellites must be between 2.7 and 3.3).
- Display of the channels reported by the satellites
- Display of the status of the channels (turquoise = channel delivers data, pink = channel does not deliver data)
- If existing, impedances of the channels are displayed in colours.
- A click on the channel shows further details (e.g. sampling rate)

2.2.7 Select Heally-Master

New selection of the master in case of connection problems after switch-on and off, changing the master, update of firmware within the master. This dialog enables the selection of a Heally-Master known by the sytem. If not already existing a click on the button *Scan Masters* searches for masters. XXMaster enables the possibility of an interactive port adjustment. These adjustments may be done in the next dialog *Setup*.
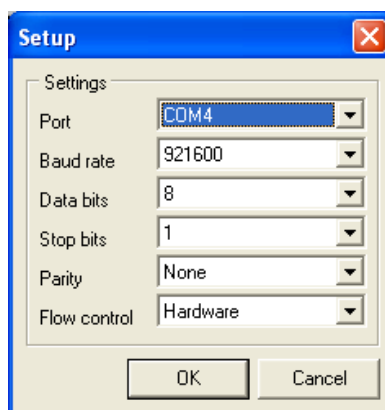
For the connection of the master it is necessary that the port parameter are correctly adjusted (see dialog *Setup*) and that the right port is chosen (see under Windows or Bluetooth environment).

The Baud-rate has to be chosen accordingly to the configuration of the master (*Master-Configuration*). The Baud-Rate for Bluetooth = 460800; the Baud-Rate for USB-Chip Texas Instruments TUSB3410 = 230400. The Baud-Rate for the signal chip CP2101 = 921600.

All other inputs are to be done accordingly to the *Setup*-dialog.

3   Menu bar

3.1   LAB File
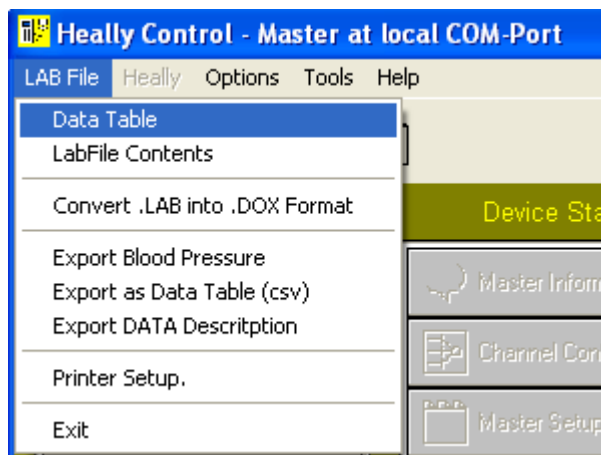
The data gathered by *Healthlab* are saved in a spezial format. This format corresponds with the sequentiel character of the data (*LAB-File*).

3.1.1   Data Table

A click of the button *Data Table* opens a table that shows the recorded data in alphanumerical order. The table consists of general information on the file and channel values. Each value is shown as a number and its belonging channel. The whole system is based on a table of 256 channels. These channels are divided into groups and differently identified. In general a *channel ident* consists of 4 byte, the first one shows the channel's character.

3.1.2 Convert .LAB into .DOX-Format

The data gathered by the HEALLY-Master (*LAB-Files*) are in chronological order. For the evaluation, visualization and the *Data-Export* a conversion is necessary that arranges the data channelwise. Due to this reason *LAB-Files* have to be converted into *DOX-Files*. This conversion happens either automatically after the reading of the data or may be done interactively with the button *Convert.LAB into .DOX-Format* (see also HlabExport).

Further work with DOX-Files may be done with the HL-Explorer.

3.1.3 Export Blood Pressure

If the data includes blood pressure values measured by MobilOGraph, these may be shown and saved as a text-file.

3.1.4 Export as Data table (csv)

Data export of LAB-data in table-format. The data of choosed channels are exported in tables. The first column shows the time reference. The next columns show the referring channel data. Reference time, time scales, channels and channel scales as well as dividing marks and display of the *Missings* may be configured.
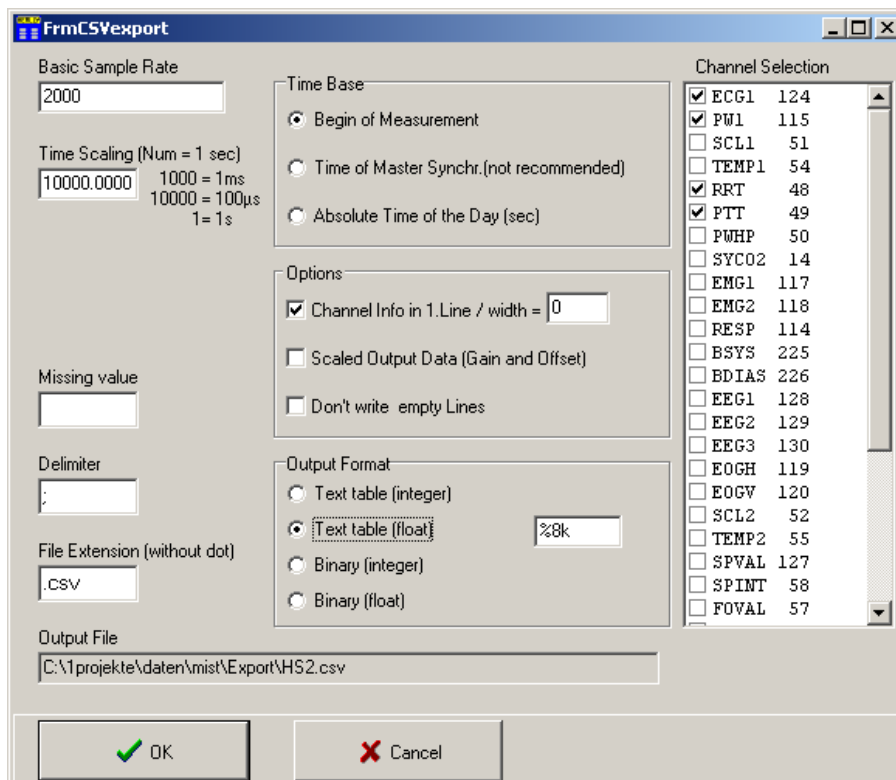
Basic Sample Rate

Time dismissal of the data table. 1000 means that for each milli sec. a row is produced (see *Don't write empty lines*).

Time Scaling

The first column of the table refers to time. With this setting the scale is done e.g:

1	means, that the time unit shall be	1s
1.000	means, that the time unit shall be	1ms
10.000	means, that the time unit shall be	100us

Missing value

Marks respectively a chain of marks is used for missing values (standard = no mark)

Delimiter

Limitation of marks for data fields, if the table is shown in Ascii-format.

File Extension (with dot)

Extension of the file (including the dot). The register is the global export register (file-name: = export register + name of the source file + file extension)

Time Base

Fixing of time point zero (starting time of measurement or absolute day time are possible).

Options

Limitation of marks for data fields if the table is shown in Ascii-format.

Channel Info in 1.Line / width =N

Channel names in the first row of the table (N determines the width of each channel name).

Scaled Output Data (Gain and Offset)

The channel data are scaled (with *gain* and *offset*). These values are provided by the referring measure-satellite, gain and offset are included within the *Satellite-Descriptors*.

Don't write empty Lines

Lines of the table, without any data will not be exported.

Output format

Defining the format. Table may be shown as text-files or binary-files. For both tables whole numbers or floating-point-numbers are possible. For comma-numbers in Ascii-format the format string is used for all values (standard "%8.3f"). In case of a binary display some parameters are of no meaning (*Missing value, Delimiter, Channel Info*). *Channel selection*: Choosing of the channels desired by setting a checkmark. Only available channels are shown.

Export Data Description

Channel data are exported into an *INI-File* of the export-register.

3.1.5 EXIT

Exit finishes the program.

3.2 Heally

Menu buttons are offered for the steering of the *Heally-Master*.

Fenster noch zu aktualisieren – Menüpunkte wurden verändert

The menu is only active if the program is connected with a *Heally-Master*. It enables to give certain commands to the master or the satellites. It also includes all commands of the main window.
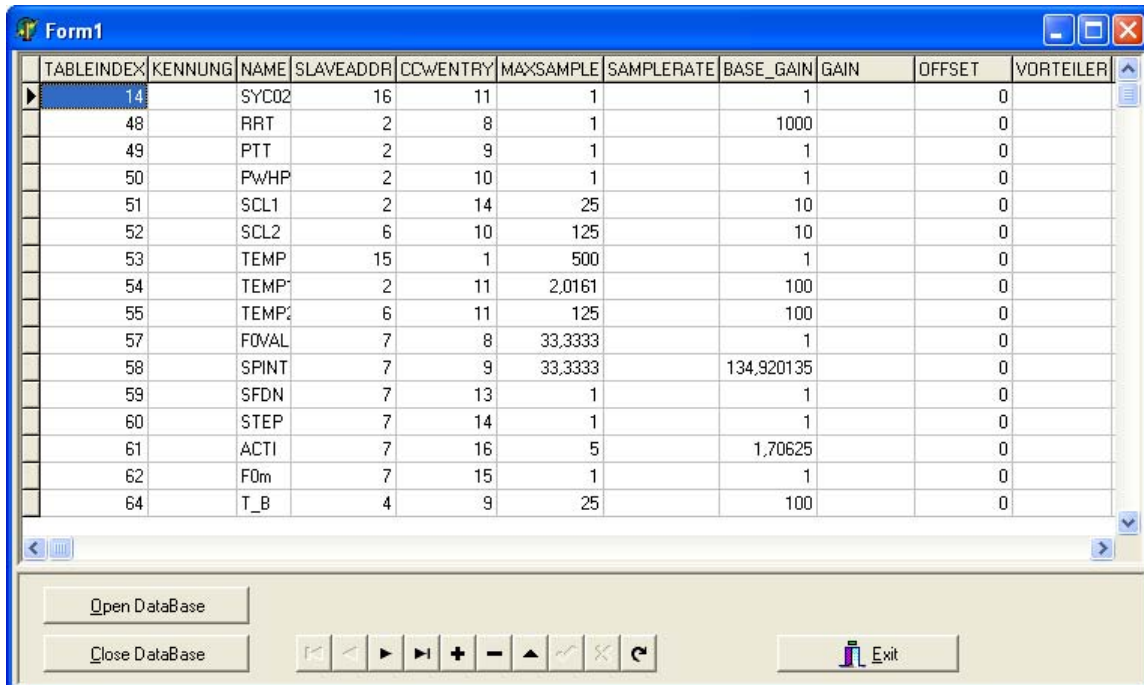
3.2.1 Device Status and Information

Query of status information on the system, internal master-parameter and internal master-time.

3.2.1.1 Satellite Descriptors

Information on satellites are shown, consisting of satellite- and channel-descriptors. Each satellite has its own column. It has to be distinguished between *slave-address* and *satellite-type*. The slave address ranges between 1..14. It describes the address of a satellite within the sytem. The satellite-type describes the kind of the satellite depending on the producer.

3.2.1.2 Channels Parameter

TABLEINDEX	KENNUNG	NAME	SLAVEADDR	CCWENTRY	MAXSAMPLE	SAMPLERATE	BASE_GAIN	GAIN	OFFSET	VORTEILER
14		SYC02	16	11	1		1		0	
48		RRT	2	8	1		1000		0	
49		PTT	2	9	1		1		0	
50		PWHP	2	10	1		1		0	
51		SCL1	2	14	25		10		0	
52		SCL2	6	10	125		10		0	
53		TEMP	15	1	500		1		0	
54		TEMP'	2	11	2,0161		100		0	
55		TEMP2	6	11	125		100		0	
57		F0VAL	7	8	33,3333		1		0	
58		SPINT	7	9	33,3333		134,920135		0	
59		SFDN	7	13	1		1		0	
60		STEP	7	14	1		1		0	
61		ACTI	7	16	5		1,70625		0	
62		F0m	7	15	1		1		0	
64		T_B	4	9	25		100		0	

Open DataBase   Close DataBase   Exit

Information about the current channel parameters is indicated such as amplify, sampling rate, upper and lower critical frequency, filter frequencies etc. These data are led in the data base *HLCDT.dbf*.

Caution! Configuration data should not be adjusted or changed here, the system maintains the table automatically!

3.2.2 Commands and Measurements

Commands to start and stop measurements (= button of main window).

3.2.3 Configuration

Deleting data records within the Master. Modifications on the data bus and on the range for individual satellites

(**Caution!** Thus one can also finish the system).

3.2.3.1   Synchronize Master Clock with PC-Clock

See 3.2.3.1.

3.2.3.2   Setup

See 3.2.3.2.

3.2.3.3   Offline Setup

Setup for certain measurements.

3.2.3.4   Erase Data in Heally-Master

Deletes data within the flash-memory of the master and sets memory free.

3.2.3.5   Load Protocol Schedule into Master

Loads measuring program with automatic time-regime for processing into the master.

3.2.3.6   Firmware Update of all Components

Checking the version of firmware in master and satellites. The release number announced by the components is compared to the ones stated within the configuration file (*ZipHeally.zip*). In case of need a newer version is updated into the components.

Caution! Never interrupt the loading process, as during the loading process the existing firmware is deleted and thus the components destroyed (a new initialization at KIE Celle is necessary). Information for these updates are included in the file*ZipUpdate.zip*. In case of software-updates this file needs to be copied into the register of the *Heally-Program*. (The contend is copied into the present configuration and the file is deleted afterwards).

3.2.4   Extended Master Functions

These functions are mainly used to recognize errors and checking of data transfers.

3.2.5   Extended Satellite Functions

These are functions for the manipulation of satellite-channels.

3.2.6   Firmware Update – Master

Software within the master may be exchanged (for experts only).
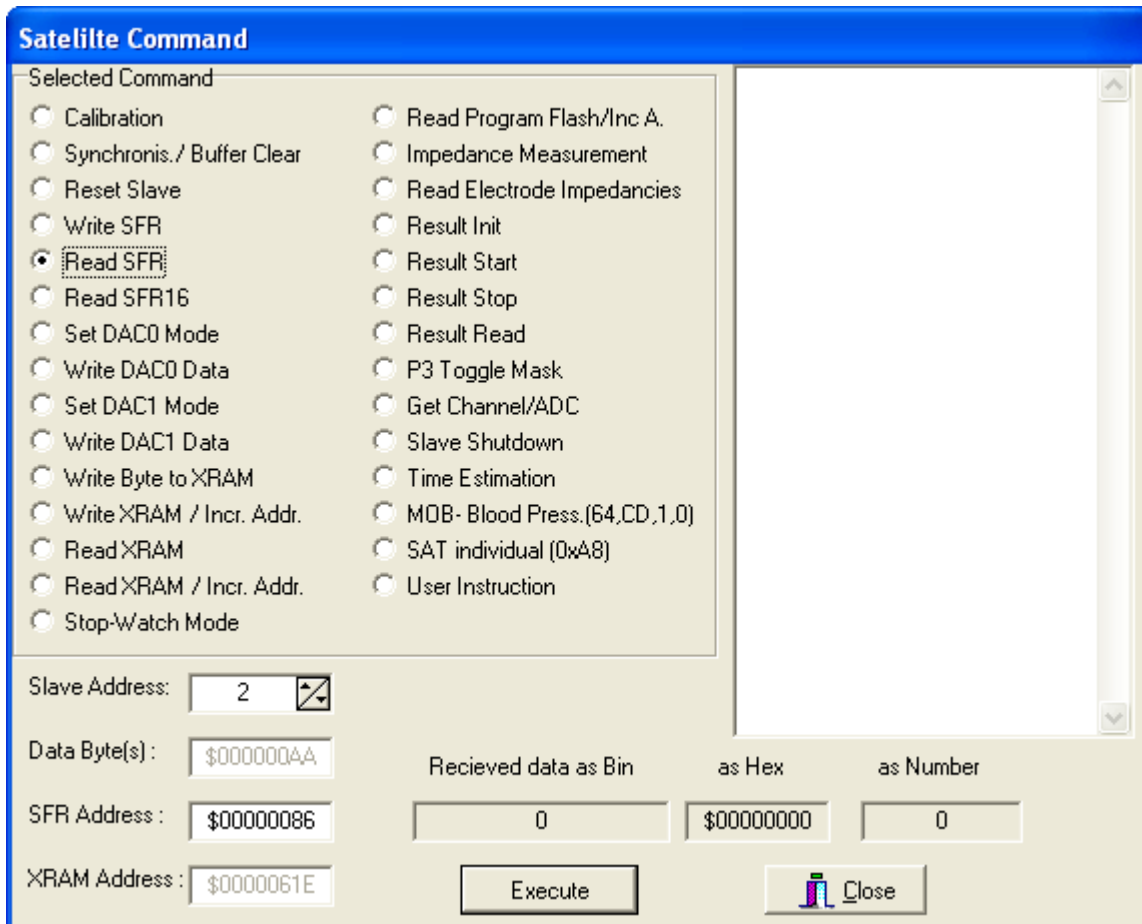
3.2.7 Firmware Update - Slave
Software within single satellites may be exchanged (for experts only).

3.3 Options

3.3.1 Folders
Adjustment of data registers for different data types. The program needs a few configuration files, they are summarized within the file *ZipHeally.zip*.
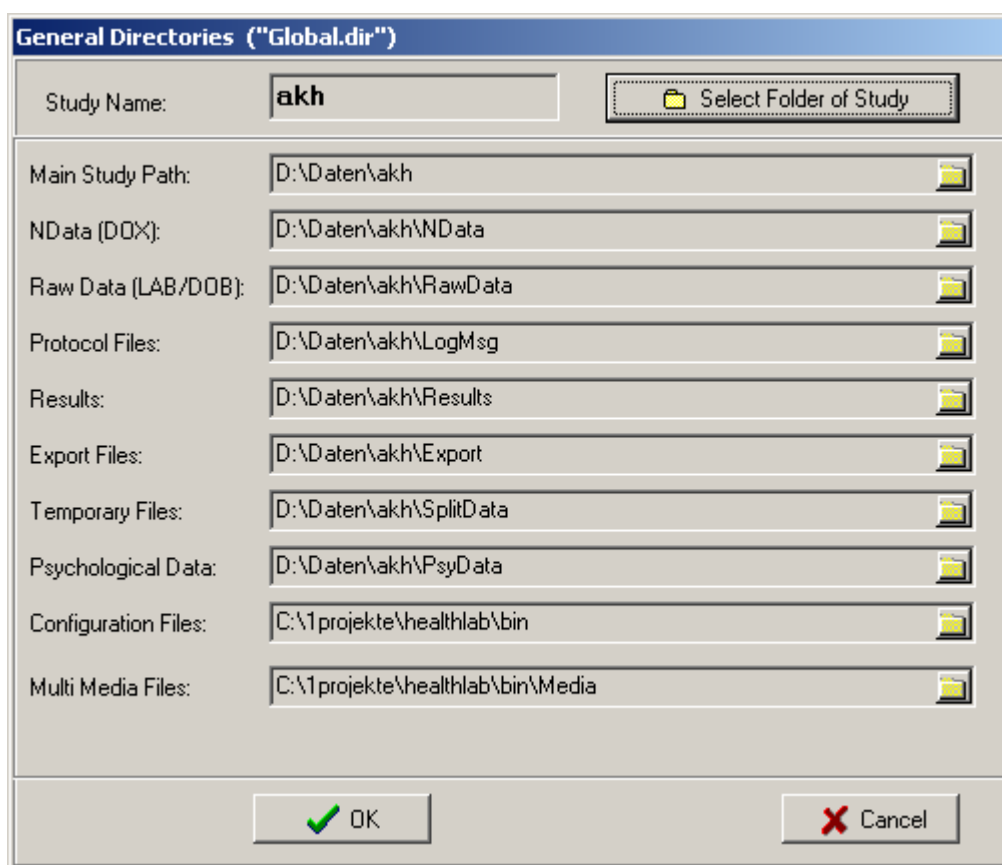
With *Select Folder of Study* a register may be chosen, that includes different data registers (Ndata..Psychological Data).

Configuration-files should be stated by the program register.

3.3.2   Show all Log. Messages

Display of program anouncements and errors.
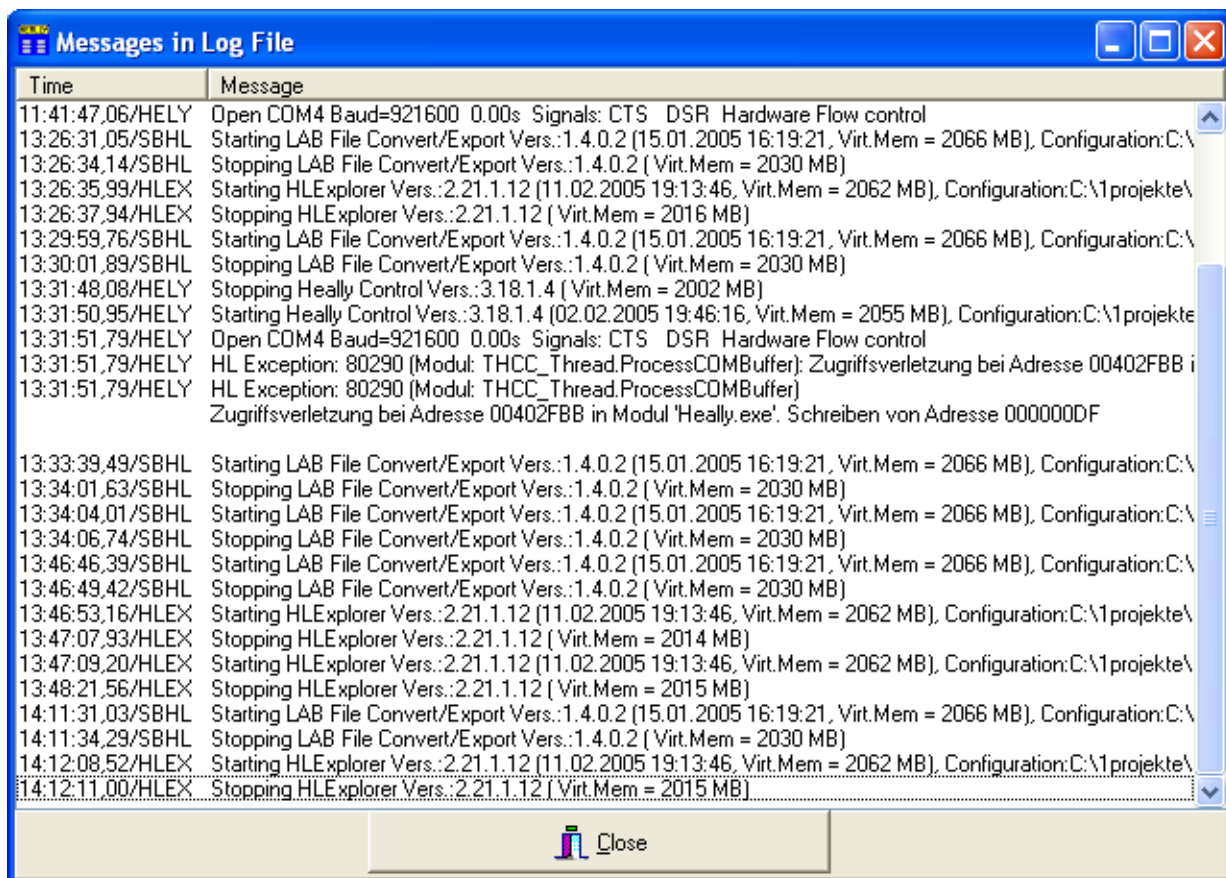
3.4   Tools

Here functions are summarized referring to configuration files and firmware it also includes an editor for databases, textfiles and INI-Files.

4   Installation

4.1   New Installation

The installation of the software happens automatically by starting *Setup.exe* within the installation medium. Triber for bluetooth and/or USB-adapter are to be installed separately. When starting *Heally* the first time, the register should be checked first and if necessary be adjusted (Program Heally→Options→Folders).

4.2   Updates

Updates are delivered as a zip-file. The zip-file needs to be unpacked and all files included are to be copied into the register of the *Heally-program* (standard: *c:\programme\spacebit\heally*). Already existing program files will be overwritten and eventually an update of the configuration *ZipHeally.zip* is added. The update of the configuration is done when *Heally* is started the next time.
Caution! Already existing configurations may be substituted, that means all parameters need to be checked before starting the next measurement.

5   Enclosure

5.1   Starting the program by using the command line

The program may be started by input of the parameter within the command line.

The input: Heally/? opens the dialog and shows the command line parameter.


```
364                                                                    _ □ ×

                          Heally Commandline Parameter

usage: "HEALLY [/switch1=Value1] [/switch2=Value2] ...
Switches are:
/?  -  this help
/I=IniFileName  - use this INI-File for pathes and configuration
/E    -  Allow Experts menu
/O    - No Master initialization during Program start
/M="MasterName"   - Select Master Name {z:B."Master31")




                                 [ Close ]
```
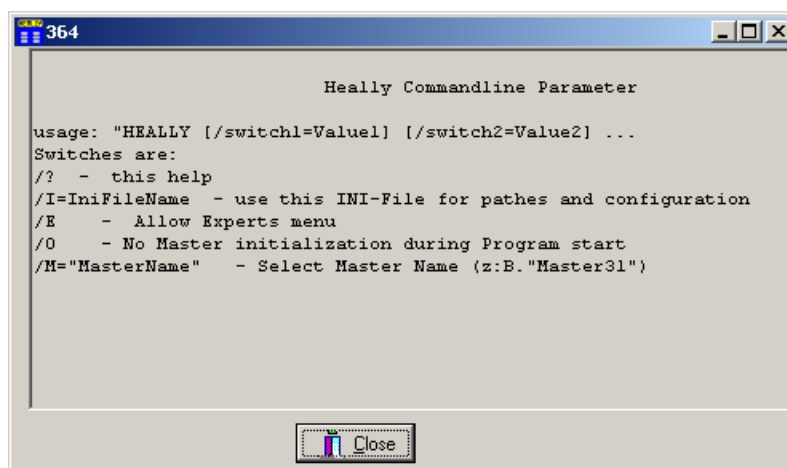
Further parameters are:

   Heally /O

   Heally /M

The Parameter INI-File is the name of the configuration file (standard *ZipHeally.zip*).
The configuration file includes all configuration parameter of the program during run time. It consists of files in program-specific formats. A few User-settings are saved in the windows-registry.

5.2   Structures of Data

5.2.1   „LAB"-File

position	marking	length+type	content
0..31	Header	(32) string	
32	FIX02	(1) byte	0x02
33..34	Anzahl der Datensaetze	(2) short integer	
35..38	Datum	(4) byte	0x6, Jahr, Monat, Tag
39..42	Zeit	(4) byte	0x7, h,min, sec
43..46	Setup-Kennung	(4) byte	0x0 0x0 0x0 0x80 0x51 0x0
47..304	Setup Daten	(258) byte	
305..305+2*L1+4	Stellitedescriptor1, falls vorhanden	(2*L1+6)	0x0 0x0 0x0 L1 0x4A SLAVE
	Stellitedescriptor14,falls vorhanden	(2*L14+6)	0x0 0x0 0x0 L14 0x4A SLAVE
DATBEG+4N	Kanal daten	(4*N) byte	1 byte Kanalkennung,

DATBEG +4N+1..	Messdauer in sec(t)	(4) byte	3 byte Kanaldaten 0x0 0xFA Hi(t) Lo(t)
DATBEG +4N+5..	Datensatz Ende	(4) byte	0x0 0xFE 0x0 0x0
DATBEG +4N+8+4X	Füllzeichen Nächster Datensatz Datum Struktur identisch ab Position 35 für jeden Datensatz	(4*X) byte w	0xFF,0xFF,0xFF,0xFF

5.2.2 Idents of Data-Channels

5.2.2.1 Overview of Channel-Idents

Channel data are save das 4-Byte words. Due to sequentiel data flow channels are associated with code words. 256 channels are possible. The first or the first and second Byte state the channel code word. For 2*12 bit channels (KA=112..KA=159) is valid: the first value consists of halfbytes 0UVW, the second of 0XYZ (32 bit-code therefore is in the file: "KA VW UX YZ").

table index	chan-nel (KA)	word-structure	content	bit-example 1.byte	2.byte	3.byte	4.byte
0	V0	00 00 NN nn Label Subaddr	Variable Block(N bytes)	00000000	0000000	Hi(N/2-1)	LO(N/2-1)
241	SGL1	00 01 n1 n2 n3 n4	Signal-Struktur (N Bytes)	00000000	0000001	Lo(N)	HI(N)
1	S1	01 xx xx xx	24 Bit Daten	00000001			
14	S14	0E xx xx xx	24 Bit Daten	11100000			
15	S15	0F kk xx xx	16 Bit Daten	00001111	Sub Kanal	X1 x2	X3 x4
16	L0	10 xx xx xx	24 Bit Daten	00010000	x1 x2	x3 x4	X5 x6
111	L95	6F xx xx xx		01101111			
112	F0	70 xx xx xx	2*12 Bit Daten	01110000	x1 x2	x3 x4	x5 x6
159	F47	9F xx xx xx		10011111	VW	UX	YZ
160	KH0	A0 xx xx xx	12 Zeit+ 12 Bit Daten	10100000	T15..T8	T7..T4 X(11,10,9,8)	YZ
160	KH16	B0 xx xx xx	10 + 14 Bit Daten	10110000	VW	U(9,8) X(13,12,11,10,9,8)	YZ
191	KH31	BF xx xx xx		10111111			
192	T0	C0 xx xx xx	4*24Bit in 4 Worten	101100pp			
203	T11	EC xx xx xx		111011pp			
K204		00 4x xx xx	Reserviert für später	00000000	0100 x1	x2 x3	x4 x5
K207		00 7x xx xx	Reserviert für später	00000000	0111 x1	x2 x3	x4 x5
K208	D0	00 D0 xx xx	16 Bit Daten	00000000	11010000		

K239	E15	00 EF xx xx	16 Bit Daten	00000000	11101111		
K240	SYNC	Fx xx xx xx	Synchronisations-Daten	1111xxxx			
K241		00 F1 xx xx	Reserviert für interne Verwendung	00000000	11110000		
K255		00 FF xx xx	Reserviert für interne Verwendung	00000000	11111111		

5.2.2.2 Channel Tables

table index	chan-nel	byte(s)	name	information - content	
0	V0	00	Block vom Master(Setup, Descriptors)	Variable Block	
1	SGL1	01	SignalDaten	8 Bit SignalCode(0x47) 32 Bit SignalSize	
2	S2	02		24 Bit Daten	
3	S3	03		24 Bit Daten	
4	S4	04	TEM	24 Bit Daten	TEM
5	S5	05		24 Bit Daten	
6	S6	06	Datum	24 Bit Daten	DATUM CT_DATE
7	S7	07	Zeit	24 Bit Daten	TIME CT_TIME
8	S8	08	SYNC-Time	24 Bit Daten	CT_SYNC
9	S9	09	Counter-Wert ms	24 Bit Daten	MSCNT CT_COUNT2ms
10	S10	0A	Marker vom PC	24 Bit Daten	HOM
11	S11	0B	(TE-Marker, Eventkanal)	8 Bit Slaveadresse 16 Bit Eventmaske	CT_SATEVENT
12	S12	0C	(TE-Timer, User evnts Time estimation	8 Bit Slaveadresse 16 Bit Daten	CT_TE
13	S13	0D		8 Bit Slaveadresse 16 Bit Daten	CT_STEG
14	S14	0E	Satelliten Counter	8 Bit zugehöriger Kanal 16 Bit Counter1ms	CT_SATCOUNT ms
15	S15	0F	0F 00..D0 Kanal 15 (0F)	8 Bit Sub-Kanal 16 Bit Daten	EX
16	L0	10	Status-Wort Master	24 Bit Daten	ST00
17	L1	11	Status-Wort Slave 1	24 Bit Daten	ST01
18	L2	12	Status-Wort Slave 2	24 Bit Daten	ST02
19	L3	13	Status-Wort Slave 3	24 Bit Daten	ST03
20	L4	14	Status-Wort Slave 4	24 Bit Daten	ST04
21	L5	15	Status-Wort Slave 5	24 Bit Daten	ST05

22	L6	16	Status-Wort Slave 6	24 Bit Daten	ST06
23	L7	17	Status-Wort Slave 7	24 Bit Daten	ST07
24	L8	18	Status-Wort Slave 8	24 Bit Daten	ST08
25	L9	19	Status-Wort Slave 9	24 Bit Daten	ST09
26	L10	1A	Status-Wort Slave 10	24 Bit Daten	ST10
27	L11	1B	Status-Wort Slave 11	24 Bit Daten	ST11
28	L12	1C	Status Wort Slave 12	24 Bit Daten	ST12
29	L13	1D	Status Wort Slave 13	24 Bit Daten	ST13
30	L14	1E	Status Wort Slave 14	24 Bit Daten	ST14
31	L15	1F	Besonderer Satelliten Event Kanal 2. Byte Slave Adresse 3. 4. Byte 16 Eventmaske	8 Bit Slaveadresse 16 Bit Eventmaske	CT_SAT1F
32	L16	20	Fehlerkanal Master und Satelliten	8 Bit Slaveadresse 16 Bit Fehlercode /8 Bit Flag, 8Bit Fehlernummer	ERRslave
33	L17	21	Kanalwerte Missings (Kanal und Anzahl)	8 Bit Kanalnummer 16 Bit Anzahl der fehlenden Werte	CT_MISSINGS
34	L18	22		8 Bit Slaveadresse 16 Bit ??	
35	L19	23		8 Bit Slaveadresse 16 Bit ??	
36	L20	24	Kanalwerte Missings (Kanal und Anzahl)	8 Bit Kanalnummer 16 Bit Anzahl der fehlenden Werte	
37	L21	25		8 Bit Kanalnummer 16 Bit ??	
38	L22	26		8 Bit Kanalnummer 16 Bit ??	
39	L23	27		8 Bit Kanalnummer 16 Bit ??	
40	L24			8 Bit Kanalnummer 16 Bit ??	
41	L25			24 Bit Daten ??	
42	L26			24 Bit Daten ??	
43	L27			24 Bit Daten	
44	L28			24 Bit Daten	
45	L29			24 Bit Daten	
46	L30			24 Bit Daten	
47	L31			24 Bit Daten	
48	L32			24 Bit Daten	RRM
49	L33			24 Bit Daten	ATMM
50	L34			24 Bit Daten	SCL
51	L35			24 Bit Daten	SCL1
52	L36			24 Bit Daten	SCL2
53	L37			24 Bit Daten	TEMP
54	L38			24 Bit Daten	TEMP1
55	L39			24 Bit Daten	TEMP2

56	L40		Hilfskanal (Sat02)	24 Bit Daten	HK56
57	L41		Stimmgrundfrequenz	24 Bit Daten	F0VAL
58	L42		Stimmintensitaet	24 Bit Daten	SPINT
59	L43		Trittzeit/msec	24	SFDN
60	L44		Schrittzeit/msec		STEP
61	L45		Actigraph		ACTY
62	L46		F0m	24	F0m
63	L47	3F	HOMOSAT_0		HSU0
64	L48	40	HOMOSAT_1		HSU1
65		41	HOMOSAT_2		HSU2
66	L50		Umgebungstemperatur		ETMP
67	L51		Umgebungsluftdruck		EQNH
68	L52		Luftfeuchte		HUMI
69		45		24	
70	L54	46	Joystick Buttons		TEMP3
71	L55	47	X-Joystick		TEMP4
72	L56	48	Y-Joystick		TEMP5
73	L57	4A	Z-Joystick		TEMP6
74	L58	4B			TEMP7
75	L59	4C			TEMP8
76	L59	4C			TEMP9
77	L59	4D			TEMP10
78	L59	4E			TEMP11
79	L63	4F		24 Bit Daten	TEMP12
80	L64	50			RR2
81	L65	51			ATM2
82	L66	52			RR3
83	L67	53			ATM3
84	L68	54			RR4
85	L69	55			ATM4
86					
95	L79	5F	Simulation Sat RS485	24 Bit Daten	SIM24
96	L80	60			
97	L81	61			
108	L92	6C			
109	L93	6D			
110	L94	6E			
111	L95	6F			
112	F0	70		2 * 12 Bit Daten	
113	F1	71	EKG – Kanal	2 * 12 Bit Daten	ECG
114	F2	72	Atmung	2 * 12 Bit Daten	RESP
115	F3	73	Pulswelle	2 * 12 Bit Daten	PW
116	F4	74		2 * 12 Bit Daten	CVP
117	F5	75	EMG – Kanal 0	2 * 12 Bit Daten	EMG1

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118	F6	76	EMG – Kanal 1	2 * 12 Bit Daten	EMG2
119	F7	77	EOG horizontal	2 * 12 Bit Daten	EOGH
120	F8	78	EOG vertikal	2 * 12 Bit Daten	EOGV
121	F9	79	EGG – Kanal 0	2 * 12 Bit Daten	EGG1
122	F10	7A	EGG - Kanal 1	2 * 12 Bit Daten	EGG2
123	F11	7B	EGG – Kanal 2	2 * 12 Bit Daten	EGG3
124	F12	7C	EKG- Kanal1	2 * 12 Bit Daten	ECG1
125	F13	7D		2 * 12 Bit Daten	
126	F14	7E		2 * 12 Bit Daten	
127	F15	7F	StimmSample	2 * 12 Bit Daten	SPVAL
128	F16	80	EEG – Kanal 0	2 * 12 Bit Daten	EEG1
129	F17	81	EEG – Kanal 1	2 * 12 Bit Daten	EEG2
130	F18	82	EEG – Kanal 2	2 * 12 Bit Daten	EEG3
131	F19	83	EEG – Kanal 3	2 * 12 Bit Daten	EEG4
132	F20	84	EEG – Kanal 4	2 * 12 Bit Daten	EEG5
133	F21	85	EEG – Kanal 5	2 * 12 Bit Daten	EEG6
134	F22	86	EKG – Kanal 1	2 * 12 Bit Daten	ECG1
135	F23	87	EKG – Kanal 1	2 * 12 Bit Daten	ECG2
136	F24	88	Pilot Kanal 1		RUOX RESP2
137	F25	89	Pilot Kanal 2		RUOZ
138	F26	8A	Pilot Kanal 3		RUOY
139	F27	8B	Pilot Move		RUD
140	F28	8C	Actigraph analog		ACTA
141	F29	8D	ECG4		E_I
142	F30	8E	ECG5		E_II
143	F31	8F	ECG6		E_III
144	F32	90	ECG7		ECG7
145	F33	91	ECG8		E_V1
146	F34	92	ECG9		E_V2
147	F35	93	ECG10		E_V3
148	F36	94	ECG11		E_V4
149	F37	95	ECG12		ECG12
150	F38	96	ECG13		ECG13
151	F39	97	ECG14		ECG14
152	F40	98	ECG15		ECG15
153					
154	F42	9A	Hilfskanal 10 (Sat2)	2 * 12 Bit Daten	HK10
155	F43	9B	Simulation Sat RS485	2 * 12 Bit Daten	SIM1
156	F44	9C		2 * 12 Bit Daten	
157	F45	9D		2 * 12 Bit Daten	
158	F46	9E		2 * 12 Bit Daten	
159	F47	9F		2 * 12 Bit Daten	
160	KH0	A0		12Bit +12Bit Daten	
161	KH1	A1		12Bit Zeit+12Bit Daten	
162	KH2	A2		12Bit Zeit+12Bit Daten	

163	KH3	A3		12Bit Zeit+12Bit Daten	
164	KH4	A4		12Bit Zeit+12Bit Daten	
165	KH5	A5		12Bit Zeit+12Bit Daten	
166	KH6	A6		12Bit Zeit+12Bit Daten	
167	KH7	A7		12Bit Zeit+12Bit Daten	
168	KH8	A8	Time and Value	12Bit Zeit+12Bit Daten	
169	KH9	A9		12Bit Zeit+12Bit Daten	
170	KH10	AA		12Bit Zeit+12Bit Daten	
171	KH11	AB		12Bit Zeit+12Bit Daten	
172	KH12	AC		12Bit Zeit+12Bit Daten	
173	KH13	AD		12Bit Zeit+12Bit Daten	
174	KH14	AE		12Bit Zeit+12Bit Daten	
175	KH15	AF		12Bit Zeit+12Bit Daten	
176	KH16	B0	Histogramme	10Bit+14Bit Daten	
177	KH17	B1		10Bit+14Bit Daten	
178	KH18	B2		10Bit+14Bit Daten	
179	KH19	B3		10Bit+14Bit Daten	
180	KH20	B4		10Bit+14Bit Daten	
181	KH21	B5		10Bit+14Bit Daten	
182	KH22	B6		10Bit+14Bit Daten	
183	KH23	B7		10Bit+14Bit Daten	
184	KH24	B8	Event(ECG-R) mit Zeitpunkt 10 Bit Counter(ms), 14 Bit Wert	10Bit+14Bit Daten	R-ECG
185	KH25	B9	Time and Value	10Bit+14Bit Daten	
186	KH26	BA		10Bit+14Bit Daten	
187	KH27	BB		10Bit+14Bit Daten	
188	KH28	BC		10Bit+14Bit Daten	
189	KH29	BD		10Bit+14Bit Daten	
190	KH30	BE		10Bit+14Bit Daten	
191	KH31	BF	Time and Value	12Bit+12Bit Daten	
192	T0	C0		2*13Bit in 2 Worten	
193	T1	C4		2*13Bit in 2 Worten	
194	T2	C8		2*13Bit in 2 Worten	
195	T3	CC		2*13Bit in 2 Worten	
196	T4	D0		3*16Bit in 2 Worten	
197	T5	D4		3*16Bit in 2 Worten	
198	T6	D8		3*16Bit in 2 Worten	
199	T7	DC		3*16Bit in 2 Worten	
200	T8	E0		4*24 Bit in 4 Worten	
201	T9	E4		4*24 Bit in 4 Worten	
202	T10	E8		4*24 Bit in 4 Worten	
203	T11	EC		4*24 Bit in 4 Worten	
204	K204	00 40		20 Bit Daten	
205	K205	00 50			
206	K206	00 60			

207	K207	00 70			
208	K208	00 D0		16 Bit Daten	
224	E0	00 E0	Temperatur-Mittelwert Sat12	16 Bit Daten	
225	E1	00 E1	Systolischer Blutdruck	16 Bit Daten	
226	E2	00 E2	Diastolischer Blutdruck	16 Bit Daten	
227	E3	00 E3		16 Bit Daten	
228	E4	00 E4		16 Bit Daten	
229	E5	00 E5		16 Bit Daten	
230	E6	00 E6		16 Bit Daten	
231	E7	00 E7		16 Bit Daten	
232	E8	00 E8		16 Bit Daten	
233	E9	00 E9		16 Bit Daten	
234	E10	00 EA		16 Bit Daten	
235	E11	00 EB		16 Bit Daten	
236	E12	00 EC		16 Bit Daten	
237	E13	00 ED		16 Bit Daten	
238	E14	00 EE		16 Bit Daten	
239	E15	00 EF		16 Bit Daten	
240		F0..F6	Sychronisationskanal	Synchronisationsdaten im sequentiellen Strom	
241		00 01			
242		00 F2			
243		00 F3	Dummy für Timeestimation		TE_USER
244		00 F4		Reserviert für interne Verwendung	
245		00 F5			
246		00 F6			
247		00 F7			
248		00 F8			
249		00 F9			
250		00 FA	DURATION_SECS	16 Bit	DUSEC
251		00 FB			
252		00 FC	UNEXPECTEDEOF		UEOF
253		00 FD	Strukturfehler im Datenfluss	programmintern	NOSYNC,
254		00 FE	Kennung für LAB-file-Ende	0	FEND
255		0F FF	Fehlerhafte Kanalkennung	programmintern	NOCHAN