

HealthLab - HL5\_Heally V6.1

# **HL5\_Heally**

2015

Software-Description - 2



HealthLab - HL5\_Heally V6.1



2/26

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# 1 Heally Control - Overview

# 1.1 Goal of Heally program

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

The following basic functions are realised:

- Measurements may be started, stopped and programmed
- · Configuration of program-processes, protocols and channels
- Data may be visualised 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

#### 1.2 General description of main window

LAB File       Heally-Function       Hgally-Settings       Options       Iools       Help         Image: Chan       Name       SR/Hz       Master         Image: Chan       Name       SR/Hz	ik Heally Control	Bearings ) [community						
Image: Chain Name SR/Hz         Master         Device Instructions         Image: Chain Name SR/Hz         Image	LAB File Heally-Function Heally-	Settings <u>O</u> ptions <u>T</u> ools <u>H</u> elp						
Image: Constructions       Device Instructions         Image: Constructions       Device Status         Image: Constructions       Image: Construction of the status         Image: Construction of the status       Image: Construction of the status         Image: Construction of the status       Image: Construction of the status         Image: Construction of the status       Image: Construction of the status         Image: Construction of the status       Image: Construction of the status         Image: Construction of the status       Image: Construction of the status         Image: Construction of the status       Image: Construction of the status         Image: Construction of the status       Image: Construction of the status         Image: Construction of the status       Image: Construction of the status         Image: Construction of the status       Image: Construction of the status         Image: Construction of the status       Image: Construction of the status         Image: Construction of the status       Image: Construction of the status         Image: Construction of the status       Image: Construction of the status         Image: Construction of the status       Image: Construction of the status         Image: Construction of the status       Image: Construction of the status         Image: Construction of the status       Image: Construction of the status			Chan	Name	SR/Hz			
Device Instructions       Device Status       199 MHUMI 1 <ul> <li>Prepare - Satellites ON</li> <li>Stat: Recording</li> <li>Stat: Recording</li> <li>Stat: Recording</li> <li>Channel Configuration</li> <li>Stop Measurement</li> <li>Channel Configuration</li> <li>Stop Measurement</li> <li>Synchronize Heally Clock</li> <li>Synchronize Heally Clock</li> <li>Stat: Record to File</li> <li>Satellites OFF</li> </ul> <ul> <li>Master Master</li> <li>Satellites OFF</li> </ul> <ul> <li>Measurement</li> <li>State Record to File</li> <li>Satellites OFF</li> </ul> <ul> <li>Measure Setup</li> <li>State Record to File</li> <li>Satellites OFF</li> </ul> <ul> <li>HERLLYNL S. SOM</li> <li>ST: Suspend</li> <li>2.39V</li> <li>DS: 63</li> <li>1352.0 ME</li> <li></li></ul>	~~  📮 🀴 🖂 🐼		Master					
Device Instructions       Device Status       109 MHUMI 1 <ul> <li>Prepare - Satellites ON</li> <li>Start: Recording</li> <li>Start: Recording</li> <li>Stop Measurement:</li> <li>Channel Configuration</li> <li>Master Setup</li> <li>Master Setup</li> <li>Master Setup</li> <li>Scan Satellites</li> <li>Scan Satellites</li> <li>Scan Satellites</li> <li>Statt Setup</li> <li>Heally Status</li> <li>Statt Setup</li> <li>Exit</li> </ul> 109 MHUMI 1           HERLL YNL S.S. Status         Status         109 MHUMI 1           HERLL YNL S.S. Status         Status         110 MTEMP 1           HEALLYNL FW: S.50         ST: Suspend         2.397         DS: 63           1352.0 MB			61	ACTG	20			
Image: Prepare - Satellites ON       Image: Step Measurement       Image: Step Measurement         Image: Step Measurement       Image: Step Measurement       Image: Step Measurement         Image: Step Measurement       Image: Synchronize Heally Clock       Image: Synchronize Heally Clock         Image: Numerical Display       Image: Synchronize Heally Clock       Image: Step Measurement         Image: Numerical Display       Image: Step Measurement       Image: Synchronize Heally Clock         Image: Numerical Display       Image: Step Measurement       Image: Step Measurement         Image: Numerical Display       Image: Step Measurement       Image: Step Measurement         Image: Numerical Display       Image: Step Measurement       Image: Step Measurement         Image: Numerical Display       Image: Step Measurement       Image: Step Measurement         Image: Numerical Display       Image: Step Measurement       Image: Step Measurement         Image: Numerical Display       Image: Step Measurement       Image: Step Measurement         Image: Numerical Display       Image: Step Measurement       Image: Step Measurement         Image: Numerical Display       Image: Step Measurement       Image: Step Measurement         Image: Step Measurement       Image: Step Measurement       Image: Step Measurement         Image: Step Measurement       Image: Step Measurement	Device Instructions	Device Status	109	MHUMI	1			
Prepare - Satellites ON       Image: Master Information       Image: Master Information         Start Recording       Image: Channel Configuration       Image: Stop Measurement         Image: Stop Measurement       Image: Channel Configuration       Image: Stop Measurement         Image: Stop Measurement       Image: Channel Configuration       Image: Stop Measurement         Image: Stop Measurement       Image: Stop Measurement       Image: Stop Measurement         Image: Numerical Display       Image: Stop Measurement       Image: Stop Measurement         Image: Read Heally Data       Image: Stop Measurement       Image: Stop Measurement         Image: Read Heally Data       Image: Stop Measurement       Image: Stop Measurement         Image: Read Heally Data       Image: Stop Measurement       Image: Stop Measurement         Image: Stop Measurement       Image: Stop Measurement       Image: Stop Measurement         Image: Stop Measurement       Image: Stop Measurement       Image: Stop Measurement         Image: Stop Measurement       Image: Stop Measurement       Image: Stop Measurement         Image: Stop Measurement       Image: Stop Measurement       Image: Stop Measurement         Image: Stop Measurement       Image: Stop Measurement       Image: Stop Measurement         Image: Stop Measurement       Image: Stop Measurement       Image: Stop Measureme			110	MTEMP	1			
Start Recording         Start Recording         Stop Measurement         Conline Display         Numerical Display         Read Heally Data         Record to File         Statellites OFF         Record to File         Exit         Record to File         Exit         Statellites OFF         Exit         HEALLYNL         FW: 5.50         ST: Suspend         2.39V         DS: 63         139 ACC_X 40         140 ACC_Y 40         141 ACC_Z 40         SAT02 Slave2         48 RRT 1         49 PTT 1         51 SRL_F 20         54 TEMP1 1         115 PW1 500         124 ECG1 500         227 HR 1         SAT14 Slave3         133 XBUS5 100         134 XBUS3 100	Prepare - Satellites ON	😟 Master Information	111	MBARO	1			
Start Recording         Start Recording         Stop Measurement         Master Setup         Master Setup         Stop Measurement         Master Setup         Synchronize Heally Clock         Start Electronize Heally Clock         Read Heally Data         Record to File         Statellites OFF         Read Heally Core         Read Heally Data         Record to File         Statellites OFF         EXAMPLE S. SOLUTION         HERLL YNL S. SOLUTION         REALLYNL         FW: S. 50         ST: Suspend         2.397         DS: 63			139	ACC_X	40			
Stop Measurement         Image: Stop Measurement	Start Recording	Channel Configuration	140	ACC_Y	40			
Stop Measurement       Image: Stop Measurement	Statt Hoophang		141	ACC_Z	40			
Stop Wessulement       48       RRT       1         Master Setup       48       RRT       1         Master Setup       Synchronize Heally Clock       51       SRL_F       20         Master Setup       Son Satellites       51       SRL_F       20         Read Heally Data       Master Setup       115       SW1       500         Record to File       Master Setup       Satellites OFF       133       XBUSS       100         HERLLYNL       S. SS       St.       Suspend       2.39V       DS: 63       1352.0 MB	Chan Manusanant	Master Setup	SAT02	Slave2				
Image: Continue Display       Image: Continue Display         Image: Contermine Display       Image: Conting Display </td <td>stop measurement</td> <td></td> <td>48</td> <td>RRT</td> <td>1</td>	stop measurement		48	RRT	1			
Image: Continue Display       Image: Synchronize Heally Clock       Sit Start			49	PII F	20			
Image: Numerical Display       Image: Scan Satellites         Image: Read Heally Data       Image: Scan Satellites         Image: Record to File       Image: Select Master         Image: Satellites OFF       Image: Select Master         Image: Record to File       Image: Select Master         Image: Satellites OFF       Image: Select Master         Image: Record to File       Image: Select Master         Image: Satellites OFF       Image: Select Master         Image: Record to File       Image: Select Master         Image: Satellites OFF       Image: Select Master         Image: Record to File       Image: Select Master         Image: Satellites OFF       Image: Select Master         Image: Record to File       Image: Select Master	Coline Display	Synchronize Heally Clock	51	TEMD1	20			
Image: Numerical Display       Image: Scan Satellites       113 FW1 SUD         Image: Read Heally Data       Image: Scan Satellites       124 ECG1 SUD         Image: Read Heally Data       Image: Scan Satellites       124 ECG1 SUD         Image: Read Heally Data       Image: Scan Satellites       124 ECG1 SUD         Image: Read Heally Data       Image: Scan Satellites       124 ECG1 SUD         Image: Read Heally Data       Image: Scan Satellites       124 ECG1 SUD         Image: Record to File       Image: Scan Satellites OFF       Image: Scan Satellites Satellites       133 XBUSS 100         Image: Record to File       Image: Scan Satellites OFF       Image: Scan Satellites       Image: Scan Satellites       134 XBUS3 100         Image: Record to File       Image: Scan Satellites       Image: Scan Satellites       Image: Scan Satellites       134 XBUS3 100         Image: Record to File       Image: Scan Satellites       Image: Scan Satellites       Image: Scan Satellites       Image: Scan Satellites         Image: Scan Satellites OFF       Image: Scan Satellites       Image: Scan Satellites       Image: Scan Satellites         Image: Scan Satellites OFF       Image: Scan Satellites       Image: Scan Satellites       Image: Scan Satellites       Image: Scan Satellites         Image: Scan Satellites OFF       Image: Scan Satellites       Image: Scan Satel			115	DW1	500			
Image: Construction of the state of the	Numerical Display	🙀 Scan Satellites	124	FCG1	500			
Read Heally Data   Record to File   Satellites OFF     HEALLYNL   FW: 5.50   ST: Suspend   2.39V   DS: 63   1352.0 MB			227	HD	1			
Record to File       133 XBUS5 100         Satellites OFF       Exit         HEALLYNL       FW: 5.50         ST:       Suspend         2.39V       DS: 63         1352.0 MB	🔲 Read Heally Data	📒 Heally Status	SAT14	Slave3	-			
Record to File       158 Select Master       134 XBUS3 100         Satellites OFF       Exit       134 XBUS3 100         HEALLYNL FW: 5.50       ST: Suspend       2.39V       DS: 63       1352.0 MB			133	XBUS5	100			
Bits         Satellites OFF           HERLLYNL S.SOM         Exit           HERLLYNL S.SOM         6-20 22:23:30           HEALLYNL FW: 5.50         ST: Suspend         2.39V         DS: 63         1352.0 MB	Record to File	-USB Select Master	134	XBUS3	100			
HERLLYNL S.SOM 6-20 22:23:30 HEALLYNL FW: 5.50 ST: Suspend 2.39V DS: 63 1352.0 MB	Satellites OFF	Exit						
1352.0 MB .::	HEALLYNL 5.504 6-20 22:23:30 HEALLYNL FW: 5.50 ST: Suspend 2.39V DS: 63 1352.0 MB							
	SI: S	2.39V D3: 63	1352		.::			

#### Menu Bar

The menu bar is described 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 HL5\_LabToDox (see description HL5\_LabToDox).



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



A click on this icon opens the dialog Messages in Log File (see 3.4.1)

#### **Device Instructions**

In this panel you find main functions for steering the HealthLab-Hardware of the HEALLYprogram. 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 3.2.2.1.

#### **Device Status**

Functions within this panel show status and enable configurations. For the description of each function see 3.2.2.1.

#### 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 shut down in the *Master-Setup* the word *OFF* occurs instead of the sampling rate. Should the channel shut down within the *Channel Configuration* (sample rate is set on 0) it is not displayed any longer. Should the satellite shut down 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 automatic 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.

Suspend

Mode for the channel configuration within the satellites (see *Channel Configuration* 2.2.2.

*Volt* Shows battery voltage.

DS

Number of data records in Master's data flash memory (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 depends 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 stopped 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 activated 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. Data will be recorded on an internal SD-Card of the master.

## 2.1.3 Stop-Measurement

Stops the measurement and switches satellites into standby mode.

## 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.







The left panel shows some digital information and channel values. Analogue curves are displayed on the right hand side of this window. Online-display provides a lot of features. The user may modify its design, the size, the channels and the time resolution. Further on there are commands to master and satellites included. Data recording to master or to PC is also available. Take note of the status information in the upper part of the window. The header of the window contains two buttons on the right hand side (*Functions* and *Select Display*). The *function* menu and the popup menu are identical: They contain the setting of display and some execution commands of Heally.

A double mouse click in an analogue frame forces an automatic scaling of this frame.





Functions + Select Display -Recording to PC Master Recording b d Define Weight/Height Define Gender for Online-F0 (Sat07) Calibrate Satellites Blood Pressure with MOBILOGRAPH EUD Increment Phase Next Model s. Design and Synchronize Display Clear Content of Summary content Summary Frame visible Config Summary Frame Status Text Window visible Show Work Load of Satellites Configuration - Online Display Show Log Messages Exit Online Display

# 2.1.4.1 Recording to PC

Data will be stored into a LAB-file at PC (note status line at the top).

## 2.1.4.2 Master Recording

Data will be stored into Master flash memory. (note status line at the top).

## 2.1.4.3 Define Weight/Height

Set the probands weight and height. This information will be send to satellites, which need such parameters for internal calculations (e.g. impedance cardiography).

#### 2.1.4.4 Define Gender

Set the probands gender. This is necessary to calculate the pitch frequency in Satellite 7 (Voice measurement).

#### 2.1.4.5 Calibrate Satellites

Adjusting analogue channels and offset comparators.





# 2.1.4.6 Blood pressure with Mobilograph

Sending command to satellite to start a measurement of blood pressure. The "Mobilograph" is an external device connected to satellite 03.

#### 2.1.4.7 Increment Phase

Writing a Phase marker into an actual recording file. Phase is an integer number. This function increments this number.

#### 2.1.4.8 Next Model

Write Model marker in an actual recording file. The name of Model (*Model ident*) can be defined in *Configuration Online Display*.

## 2.1.4.9 Synchronise Display

This function resets internal timer in the PC-Software. This function is not dangerous, but it's only necessary Write Model marker in an actual recording file. The name of Model (*Model ident*) can be defined in *Configuration Online Display*.

#### 2.1.4.10 Clear Summary Frame

If the summary frame at the window's bottom is enabled, this command will erase the content of this frame.

#### 2.1.4.11 Summary Frame visible

The summary frame at the window's bottom may be enabled or disabled.

#### 2.1.4.12 Config Summary Frame

Dialog to define channels, colours, line types and time resolution of summary frame.





# 2.1.4.12.1 Tabsheet - Curves

🎬 Heally C	Online - Space	Bit Berlin - Kor	alewski Ele	ktronik Celle -				
Curves Scr	Curves Screen Variables Numbers							
	Channel	Autoscale Ymin	YMax I	Duration[s] Height[%]	Curve Color	Background		
1.Frame	121 🔀 🚥	•10.000	10.0000	20.0000 33 🔀	clAq 💌	cl 🗸		
2.Frame	122 🔀 🕶	•10.000	10.0000	20.0000 33 🔀	clSk 💌	cl 🗸		
3.Frame	124 🔀 🕶	-10.000	10.0000	20.0000 20 🔀	clYe 💌	cl\ 💌		
4.Frame	115 🛃	-10.000	10.0000	20.0000 13 🔀	clLin 💌	cl 🗸		
5.Frame	65 🔀 🕶	•10.000	10.0000	20.0000 0 🔀	clLin 💌	cl 🗸		
6.Frame	227 🔀 🚥	-10.000	10.0000	20.0000 0 🔀	clFu 💌			
7.Frame	85 🔀 🕶	-10.000	10.0000	20.0000 0 🔀	clYe 🔻			
8.Frame	86 🔀 🕶	-10.000	10.0000	20.0000 0 🔀	clRe 🔻	cl 🗸		
9.Frame	124 🔀 🕶	-10.000	10.0000	20.0000 0 🔀	clRe 💌	cl 🗸		
All Frames		-10	10	20	clLin 🔻	cl\ 💌		
Configuration	Configuration Name: SAT09onIm V Options -							
<b>~</b> 0	)k 🗎 🗎 l	.oad Config 🛛 🖺	Store Config	) 🗙 Cancel				

#### **Curves - Channel**

Online screen may display up to 9 channels as data curve (frames). Left column contains the numbers of channels, that might be shown. To get the list of available channels for an interactive selection, click the button [...].

Select Channel	
© ECG1 124	C SCL2 52
C PW1 115	C TEMP2 55
C SCL1 51	C EGG1 121
C TEMP1 54	C EGG2 122
C RRT 48	C GKNOT 42
C PTT 49	C GHEAD 153
🔿 рынр 50	C GALT 41
C HR 227	C GLAT 92
C EOGH 119	C GLONG 93
C BOGV 120	
🗸 OK 🗶 Cancel	





#### **Curves - Autoscale**

Y-range of curve frame will be automatic scaled. It takes one or two frame cycles.

#### Curves – Y Min / Y Max

If the Autoscale mode is disabled, the vertical range may be defined by Ymin Ymax. If Autoscale is enabled then these numbers will be used as predefined range.

#### **Curves – Duration**

Duration of a cycle of one curve from left to right.

#### **Curves – Heights**

The relative height of frame. After closing the dialog the real percentage value will be calculated by the program. Next call of dialog shows this calculated values (sum=100).

#### Curves – Colour

Colour of curve line of frame.

#### Curves – Background

Background colour of frame.

*Note:* Description of the button bar of configuration dialog at the bottom see description of HLCC 3.1

Configuration - Online Display							
Curves Screen Variables Numbers							
Full screen 🔽	Display Options						
Top[pix]: 0	Activate GPS Panel (not available)						
Left[pix]: 0	Show Tool Bar at Left edge (not available)						
Height(pix): 500	Show Master Battery Voltage						
Width[pix]: 750	Switch off - Software Filtering of Channels						
	Show Summary Frame on Bottom						
	Show Channel Info Bar						
Timer interval[msec]:  20	Hide Y-Axis in Curve Frames						
	Hide Left Panel and top Info bar						
Configuration Name: SAT10	✓ .onlm						
🗸 Ok 🛛 🖹 Load Config	Store Config X Cancel						

2.1.4.12.2 Tabsheet - Screen

Defines window size of Online display (or enable full screen display).

*Time interval* is an internal parameter (normally 50 to 200 msec, depending on computer performance).





#### 2.1.4.12.3 Tabsheet - Numbers

Configuration - Online Display							
Curves Screen Variables Numbers							
1. Column (left Side)	2. Column (center)	3. Column (right Side)					
Name Channel Precision Unit	Name Channel Precision Unit	Name Channel Precision Unit					
RRT 48 📚 0 ms	ROLL 140 🗢 2 g 🚥	HPD 513 🗘 1 ms 🚥					
HR 227 文 1 BpM	F0m 62 文 0 Hz …	+/- 514 🗢 1 ms					
PTT 49 📚 0 ms …	FOVAL 57 文 0 Hz 🚥	RMSSD 515 🛟 1 ms					
PITCH 139 📚 2 g 🚥	SCL1 51 🛟 1 kOh 🚥	TEMP1 54 🗢 1 Grd					
Configuration Name: SATU2_U7onIm V Options -							
🗸 Ok 🕒 Load Config 📑	Store Config 🗙 Cancel						

In the left panel of online window up to 12 digital values may be displayed. Channel numbers (port numbers) may be defined by numerical input or by using channel choice dialog (button *[...]*). Each channel entry consists of a channel name, channel number, presented precision and an unit label.





# 2.1.5 Read Heally Data

		Hea	ally Control	
			Switching of	if Satellites ? Nein
<b>FMIL0002</b>				
Target File Dir	ectory: E:\HLDATA\ma	n-test\RawData\		
Master MMC Files	File Size (kB)	File Date	Target Size [kB]	Properties
DATA0144 LAB	437 905	03 11 2009 08:46:18	Taiget Size [KD]	
DATA0145 LAB	1316 925	03 11 2009 09:08:28		
DATA0146 LAB	2493 162	03 11 2009 11:06:28		Disable Conversion to DOX
DATA0147 LAB	3890,691	03 11 2009 13:39:58		
DATA0148 LAB	1138 857	10 11 2009 13-39-44		
DATA0149 LAB	8319 409	21 11 2009 20:47:06		
DATA0150 LAB	25 917	21 11 2009 21-18-48		Conversion Dialog for DOX
DATAO150.BAD	42 177	21 11 2009 21-20-14		
DATAO151. BAD	92,217	21 11 2009 21-25-24		
DATAO153 LAB	125532 145	22 11 2009 09-04-30		
DATAO155. BAD	1400 581	22 11 2009 23-54-38		
DATAO155 LAB	96395 401	22 11 2009 07-44-49	96295 401	Delete Files on Master
DATAO155. LAB	1955 653	24 11 2009 10-47-32	1955 653	
DATAO157 LAB	2111 005	24.11.2009 14.37.20	1900,000	
DATA0158 LAB	3801 677	24 11 2009 15:54:30		
DATA0159 LAB	5467 341	24 11 2009 16-24-24		
DATA0137.BAD	0407,041	24.11.2005 10.24.24		
	🚌 Copy Selected Files:	👦 Delete Selected Files	SC Abort	Evit
	Master> PC	斗 in Master	CS ADOIL	V EXI

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*.

All files, that are not yet copied, will automatically be selected. This selection may be changed by the user. The data transfer starts with a click on the button "*Copy Selected Files: Master*  $\rightarrow$  *PC*". 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 may be deleted within the Master by using the button "*Delete Selected Files in Master*". Deleting of the internal memory is also possible via *Heally*-*Configuration*-*Erase Data in Heally-Master*.

## 2.1.6 Record 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.





## 2.1.7 Satellites off

Slaves are powed by master. This button switches the power **line** for the slaves off. Before plugging or unplugging a slave to the Heally-Bus this button must be pressed. After plugging or unplugging slaves the button "Scan Satellites" has to be pressed to update the Healthlab status of the master and of the host.

#### 2.2 Device Status

Functions within this panel show status and enable configurations.

#### 2.2.1 Master Information

Heally Control
* FMIL0002 5.20M 2009/3 HEALLY00
Total Flash Memory : 1015,0 MB Free Flash Memory : 766,8 MB Remaining for : 70:58 h Number of Measurements : 16 Serial Number : 00051047 Software Ident : 5.20 Battery Voltage : 4,02 V Last Internal Error : 0 RS485 Transmit Errors : 0 RS485 Receiver Errors : 0 Slave 02 : SAT02 (HSAT02-30-VS09) : SAT02-30 (HL-Sat ECC/ Puls/ Finger)
Slave 03 : SAT03 (HSAT03-03-V501) : SAT03-03 (HL-Sat EMG/ RESP/ BP)
Slave 04 : SAT25 (HSAT25-46-V509) : SAT_TP43 (HL-Sat 25 - 4 Channel Temperature)
Slave 06 : SAT30 (HSAT30-03-V503) : SAT30-03 (HL-Sat SP02/GPS)
Slave 07 : SAT07 (HSAT07-40-V504) : SAT07_40 (HL-Sat PITCH/F0)
Slave 10 : SAT25 (HSAT25-40-V509) : SAT_TP43 (HL-Sat 25 - 4 Channel Temperature)
Slave 11 : SAT11 (HSAT11-22-V505) : SAT11-21 (HL-Sat ECG 3-Kanal)
Slave 12 : SAT25 (HSAT25-42-V509) : SAT_TP43 (HL-Sat 25 - 4 Channel Temperature)
Slave 13 : SAT25 (HSAT25-43-V509) : SAT_TP43 (HL-Sat 25 - 4 Channel Temperature)
Slave 14 : SAT25 (HSAT25-44-V509) : SAT_TP43 (HL-Sat 25 - 4 Channel Temperature)
Slave 18 : SAT28 (HSAT28-01-V510) : SAT28-01 (SAT28 - Sensor brigde)
Slave 19 : SAT28 (HSAT28-01-V510) : SAT28-01 (SAT28 - Sensor brigde)
ΟΚ

States addresses of existing satellites.

Shows the dialog in which the name of the master and channel configurations may be read.

#### **Total Flash Memory**

X

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** 





# 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 (Modify Satellite Parameter).

What is shown within this dialog depends on which satellites are selected and possible settings. The following picture shows an example.

👖 Modify Satellite Param	neter						
ECG1 Sample rate	500 Hz	Slave 1 SAT02-12 Slave 3 SAT25-02 Slav					
ECG1 Gain	7,641 l/mV	Slave 6	Slave 7	Slave 8	Slave 9	Slave 10	
ECG1/PW1 Low Pass Filter	57 Hz	Slave 11	Slave 12	Slave 13	Slave 14	Master	
PW1 Sample rate	250 Hz	JIGVOTT	510/612	010/010	510/614	Mastor	
PW1 Gain	19,75 l/mV			CAT02.1	2		
TEMP1 Sample rate	2,016 Hz			5A102-1.	2		
SCL1 Sample rate	25 Hz						
SCL1 Gain	-0,001 1/mV	c	CI 1 1004 E.	ator []			
SCL1 Fac2	-0,01	J					
SCL1 Bias	-1 Ohm		11.5	500			
SCL1 10uA Factor	11,55						
		Ma	ximum: 11	.550			
		Mir	aimum: 9	000			
Idx:13 Kind:4E Flags:0							
Write Value into SAT							
		wille v	alue into SAT				





Depending on which button is chosen of the left hand 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. Maximum and minimum values will also 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 configured. The communication with the master will be checked and the existing setup is read. It also enables starting and finishing.

Master Setup : NL2010 0	× •
Master	
Control Options Stop Taste(Stop+F1) Auto Recording (1 min delay) Blood Pressure Meas. (SLAVE03, 4:15)	SD-Card File Name Identifier (4 Char) : WLAN File Counter (Index): 729
Clock Record Start 00:00:00 Shutdown after Recording Bluetooth OFF during Recording	Measuring Duration [min] : 3000
LED "data" Clock Wait	LED "data" blink on Channel: 10 📄 Beep on Channel : 0 🐳
Program Flow     Ontinuous Measurement     SET Prepare Mode after Boot	btnlNI_Export
✓ OK X Abbrechen	21.06.14 20:51:21

# 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, automatic 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 keyboard). 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 automatic 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 switched of if this function has been activated by setting a checkmark.

#### Switch Off Bluetooth

If the PC connection is finished, the Bluetooth-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:

#### **Continuous Measurement**

Continuously measurement

#### **Interval Measurement**

Measurement is recorded in intervals. Duration of recording and breaks may be defined within the field's on the 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 together with the Master. To load the file click the button: *Load Protocol Schedule*. A dialog opens to search for the requested file and opens it.

#### **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 "HLCC".





# 2.2.4 Synchronise 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 Fehler: Referenz nicht gefunden**).

# 2.2.5 Scan Satellites

A click on this button tells the Master to search for satellites, find out about their status and collect 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

∎∎ Maste	Master and Satellite Status Information							
Addr.	Sat-Type	Power Vers	ion RS48	5				
Master	NL2000M7	2.46 V 3.69	Pos   Si	ze 16.90 MB	Data Records: 0 16.8	87 MB free		
Slave O2	SAT 02_22	3.17 V 3.42	00 1	124: ECG1 - 500Hz	51: SCL1 - 25Hz	48: RRT - 1Hz	49: PTT - 1Hz	
				115: PW1 - 250Hz	54: TEMP1 - 5Hz	227: HR - 1Hz	50: PWHP - OHz	
Slave 03	SAT 03_03	3.08 V 3.38	00 1	117: EMG1 - 200Hz	114: RESP - 50Hz	86: INSP3 - 0.1Hz	226: BDIAS - 1Hz	
				118: EMG2 - 200Hz	83: ATM3 - 0.1Hz	225: BSYS - 1Hz		
Slave 05	SAT 05_05	3.20 V 3.40	00 2	128: EEGFz - 250Hz	130: EEGPz - 250Hz			
				129: EEGCz - 250Hz	131: EEG4 - 250Hz			
Slave O6	SAT 06_03	3.15 V 3.40	00 2	119: EOGH - 500Hz	52: SCL2 - 5Hz			
				120: EOGV - 500Hz	55: TEMP2 - 5Hz			
Slave 07	SAT 07_22	3.18 V 3.43	00 1	58: SPINT - 33.33Hz	127: SPVAL - OHz	140: ACTX2 - 5Hz	59: SFDN - 1Hz	62: F0m - 1Hz
				57: F0VAL - 33.33Hz	139: ACTX1 - 25Hz	61: ACTL - 5Hz	60: STEP - 1Hz	
Slave O8	SAT 08_03	3.19 V 3.42	08 1	66: ETMP - 1Hz	68: EHUMI - 1Hz			
				67: EQNH - 1Hz				

Displays the status of the master, the satellites and their channels. This includes:

- connected satellites
- RS485-Bus-Configuration (only relevant for test purposes)
- Supply power 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 stabilised 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

A dialog to select a master and to change connection properties. The dialog appears also during launch of the Heally program in case that is not a valid connection available. The button may be used in case of connection problems after switch-on and off, changing the master, update of firmware within the master or the switch to another master. This dialog enables the selection of an Heally–Master known by the system. If not already existing a click on the button *Scan Masters* searches for masters (only Bluetooth Masters). *Modify Settings* shows the properties of the master for interactive modification of connection parameter.

	Select	Master	Rear Barrister	
	Master	Entries	in Registry	
The second	MILH	0002	Bluetooth=00:17:91:03:39:07	
	○ NL20	lOWL	Server=127.0.0.1; IP-Port=1955;	
		🖊 ОК	Cancel	Delete Line Clear Master List Modify Settings

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.

# 3 Menu bar

## 3.1 LAB File

The data gathered by *HealthLab* are saved in a special format. This format corresponds with the sequential character of the data (*LAB-File*).

## 3.1.1 Convert .LAB into .DOX-Format

The data gathered by the HEALLY-Master (*LAB-Files*) are in chronological order. For the evaluation, visualisation and the *Data-Export* a conversion is necessary that arranges the data channel wise. 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.

# 3.1.2 Open LAB-File in HLExplorer

This function includes several steps: Selecting a recorded Lab-File, converting it into DOX-Format with Configuration "Default", OpenDefault", Open DOX-File in HLExplorer.

## 3.1.3 EXIT

Exit finishes the program.

#### 3.2 Heally-Function

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

📴 Heally Control - Master at local COM-Port						
LAB File	Heally Options Tools He	lelp				
	Commands and Measurem	nts 🔸 🛛 Master Internal Time				
· ·	Configuration	<ul> <li>Adjust Satellites and Channels</li> </ul>	S			
Dev	Extended Master Functior	ns 🕨 Master Switch OFF	Т			
	Extended Satellite Function	ions   Record to File	Т			
	Undate Firmware		T			
		Master Information 74	T			

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 Numerical display

## 3.2.2 Commands and Status





# 3.2.2.1 Master Internal Time

PC Clock before:	21:30:40,843	09.03.2007
laster Time Stamp:	21:30:40,928	09.03.2007
PC Clock after:	21:30:40,890	09.03.2007
Differency [s]:	0.062	± 0.012
Master Real Time Clock:	21:30:41,000	09.03.2007
Internal Counter [2ms]:	2022464	
True Master Timer[ms]:	1.999970	(-15 ppm)
Synchronization Time:	20:23:16,000	09.03.2007
Synch. Moment [10ms]:	0	
	OK	

This window shows information about time delay between the internal clock of the Master and the PC clock. First PC-Clock is read (*PC Clock before*), then Master clock (*Master Time Stamp*) and then PC-Clock again (*PC Clock after*). Synchronisation Time is the time when the Master got the PC Time (or in case of Master with internal real time clock, it is the time when the Master was switched on).

# 3.2.2.2 Adjust Satellites and Channels

This command is used for Zero-Adjusting of analogue Channel and Offset Comparators

## 3.2.2.3 Record to File

s. 2.1.6

## 3.2.3 Detailed Device Information

This viewer shows descriptors of the devices, channels and parameter of the connected Heally-Hardware.

## 3.2.4 Test Functions

These functions are mainly used to recognise errors and to check data transfers. Provides extended information about internal master configuration and memory structure. The "Read Flash Range" entry is the best choice to check the transfer rate from master to PC.

# 3.3 Heally-Settings

#### 3.3.1 Modify Satellite Calibration Parameter





See 2.2.2. Hereby you may configure satellite parameter including calibration parameter.

## 3.3.2 Set Double Sensor Calibration Values

Configure a Double Sensor in one step.

#### 3.3.3 Configure HMP-Sensors

Configure special Humity-Sensors connected wire Bridge-Satellite SAT-28.

#### 3.3.4 Master Configuration

#### 3.3.5 Filter Editor

#### 3.3.6 Erase Data in Heally-Master

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

#### 3.3.7 Format Master SD-Card

#### 3.3.8 Show Flow Chart within Master

Shows measuring program with automatic time-regime for processing what is actually loaded into the master (only available in Healthlab-Flashmaster with display).

## 3.3.9 Load Flow Chart into Master

Loads measuring program with automatic time-regime for processing into the master (only available in Healthlab-Flashmaster with display).

#### 3.3.10 Firmware Update - Master

Software within the master may be flashed (for experts only).





A firmware file may be selected by an Open-Dialog.

In case the firmware is not compatible with the master, a warning message appears. Ignoring this message may destroy the device.

# 3.3.11 Firmware Update - Slave

Software within single satellites may be exchanged (for experts only).

A firmware file may be selected by an Open-Dialog.

In case the firmware is not compatible with the selected slave, a warning message appears. Ignoring this message may destroy the satellite.

# 3.3.12 Firmware Update of all Components

This function provides automatic updates of the firmware of Healthlab devices. It checks the version of firmware in master and satellites. The release number announced by the components is compared to the ones stated within the firmware files. In case of need a newer version is updated into the components.

The following dialog appears:

Heally Control		
<b>Update in Di</b>	og Mode (User confirmation for each file) ?	
	Ja <u>N</u> ein	

"Yes": Each firmware file that will be flashed needs to be confirmed by the user individually (default).

"No": Components will be updated in quiet mode.

The next query-dialog has to be responded:



"Yes": The firmware files are taken directly from the Spacebit Server. An internet connection of the PC is required.

"No": The considered firmware files are taken from the local computer (folder ..\HL5\Firmware).



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Depending on the answers to the previous queries the update procedure starts.

In case of "Yes" the firmware files on Spacebit server are compared within the local firmware (on disk and on devices). Usually the following query dialog appears:



The answer should be set to "Yes to All", (the text line may be different).

If a new firmware is available for any device, such devices generate the following query:



"Yes" : The firmware will be flashed.

**Caution**! Never interrupt the loading process, as during the loading process the existing firmware is deleted and thus the components destroyed (a new initialisation via KIE Hambühren is necessary).

## 3.4 Options

#### 3.4.1 Show all Log. Messages

Display of program announcements and errors.

E Me	Messages in Log File					
Туре	Time	PRG	MSG-ID	Message		
MSG	00:08:46,703	HELY	11344	Create new Protocol file: H:\hldata\BS_DLR\LogMsg\X070310.log		
MSG	00:08:46,703	HELY (	11022	Start Heally Control Vers.: 4.41.2.281 (09.03.2007 21:56:21, Virt.Mem = 2055 MB), Configuration: C:\1Projekt		
MSG	00:08:47,484	HELY	10521	Open COM3 Baud=921600 0.0s Signals: CTS Hardware Flow control		

## 3.4.2 Host Settings





Configure an customized startup-display of Heally-Control.

# 3.5 Tools

1.

# 3.5.1 HLExplorer

Launching external program "HLExplorer".

# 3.5.2 HLTools

Here functions are summarised referring to configuration files and firmware. It also includes an editor for databases, text files and INI-Files.

# 3.5.3 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).

## 4 Installation

## 4.1 New Installation

The program "HL5\_Heally.exe" is included in every installation package of Healthlab-Software.

## 4.2 Updates

To update the software please follow the instructions within the documentation "HLCC"

## 4.3 Starting the program by using the command line

The program may be started using the windows command line. The following parameter are documented in:

https://secure.turboj.de/documents/commandlineparameter.pdf

*Note:* Follow this link to find the latest version of this documentation: <u>https://secure.turboj.de/documents/Heally5\_en.pdf</u>