HL5_Healy

2015

Software-Description - 2

Content

1 Healy Control - Overview

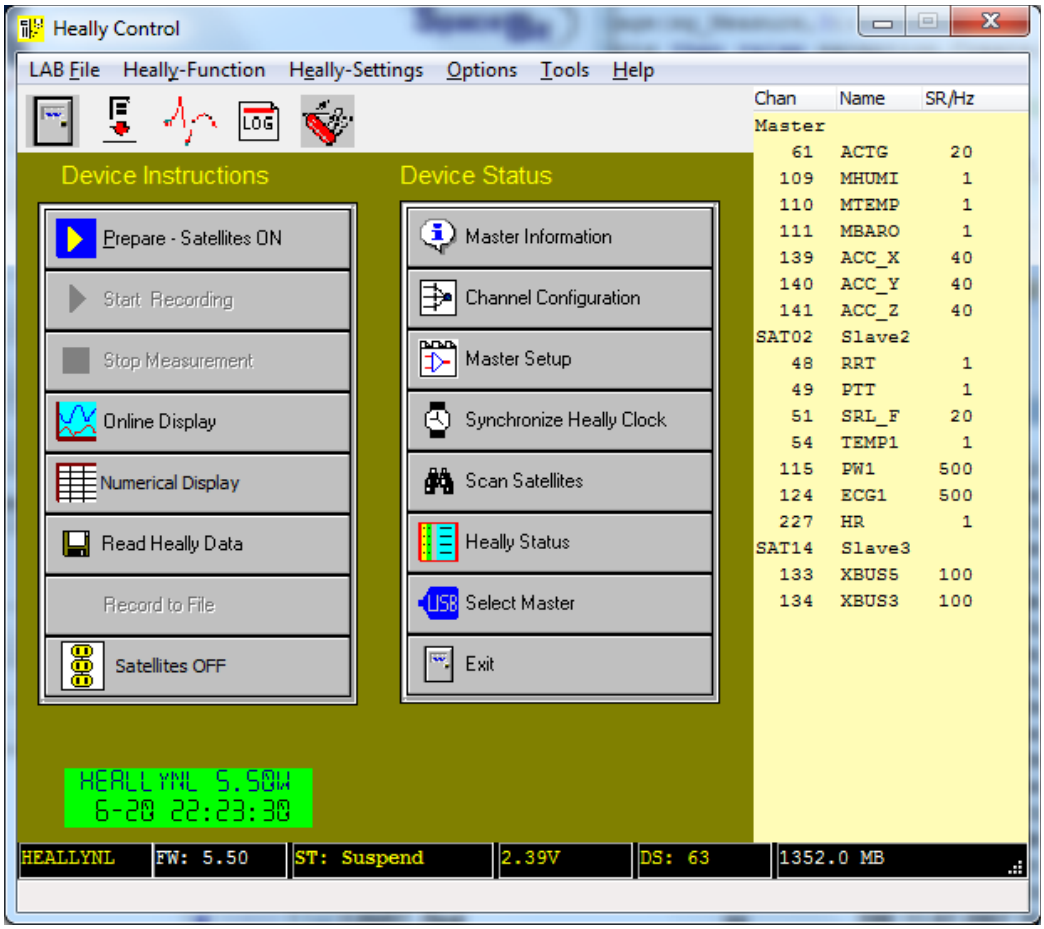
1.1 Goal of Healy program

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



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 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 3.2.2.1.

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 Healy-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 Healy-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

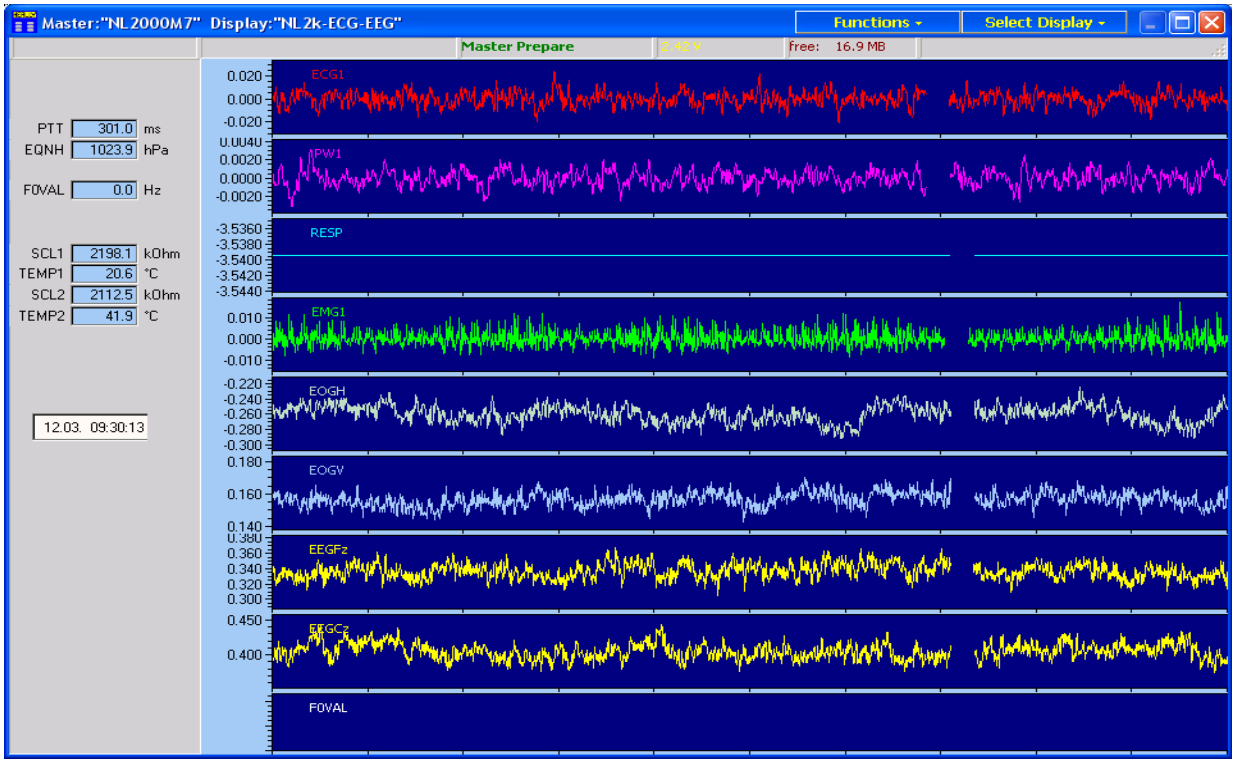
A click on this button starts satellites and the master is put into measure mode. Data will be recorded on an internal SD-Card of the master.

2.1.3 Stop-Measurement

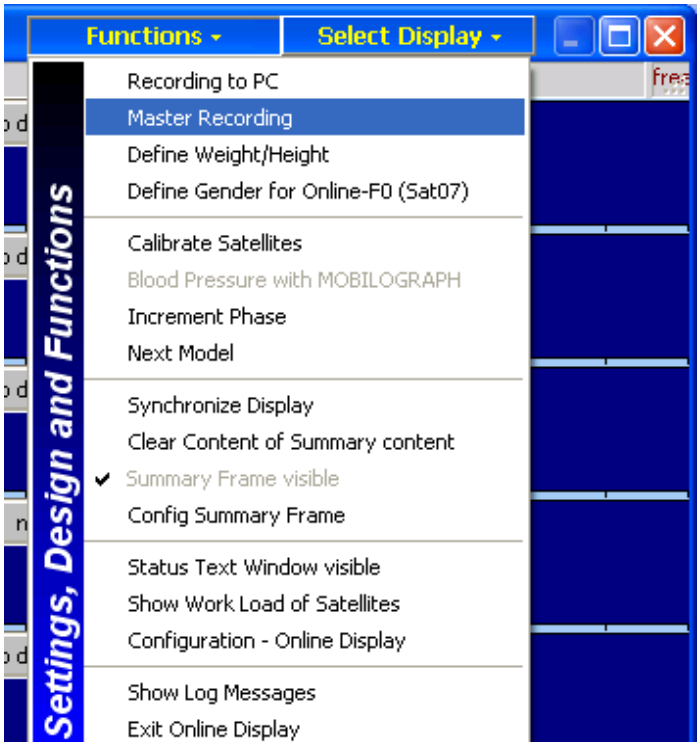
Stops the measurement and switches satellites into standby mode.

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 f*unction* menu and the popup menu are identical: They contain the setting of display and some execution commands of Healy.
A double mouse click in an analogue frame forces an automatic scaling of this frame.



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.

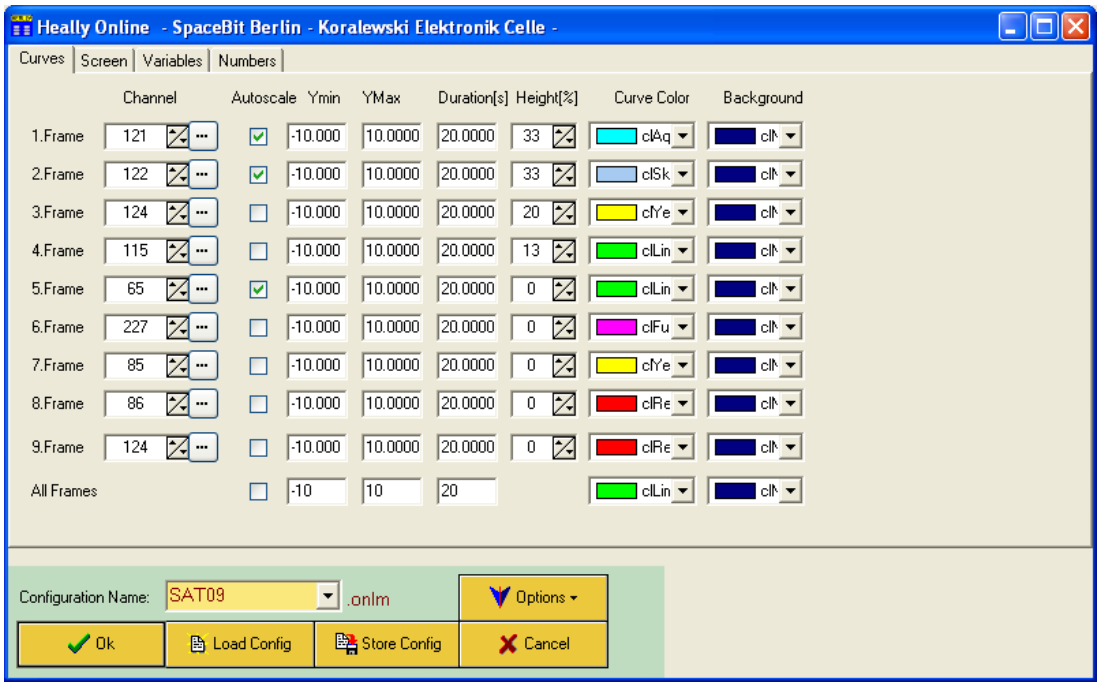
2.1.4.11 Summary Frame visible

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

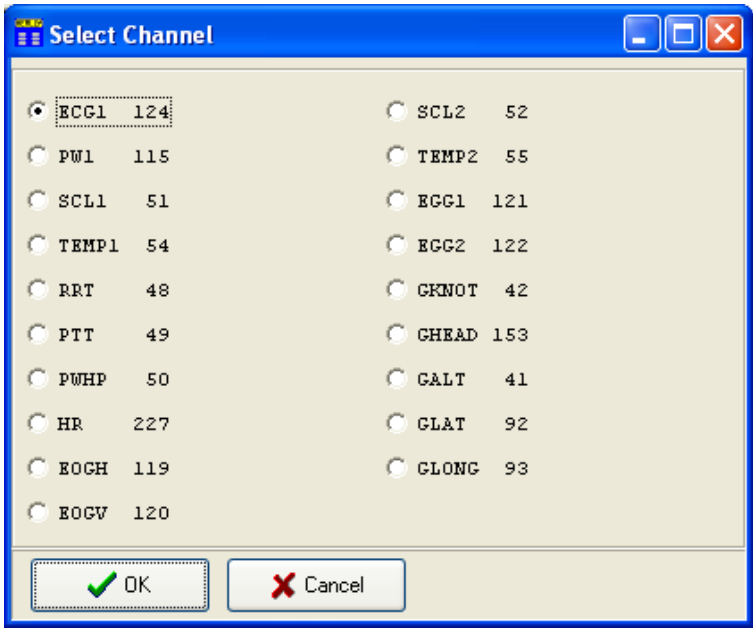
2.1.4.12 Config Summary Frame

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

2.1.4.12.1 Tabsheet - Curves



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 *[...]*.



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.

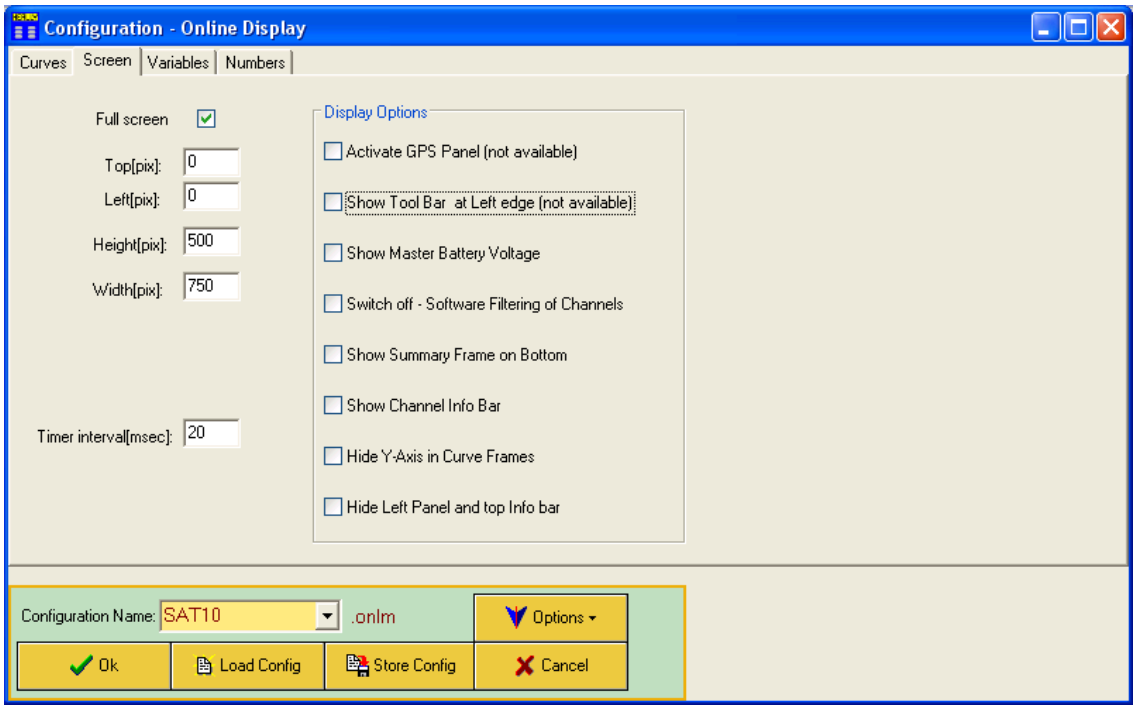
Curves – Heights
The relative height of frame. After closing the dialog the real percentage value will be calculated by the program. Next call of dialog shows this calculated values (sum=100).

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

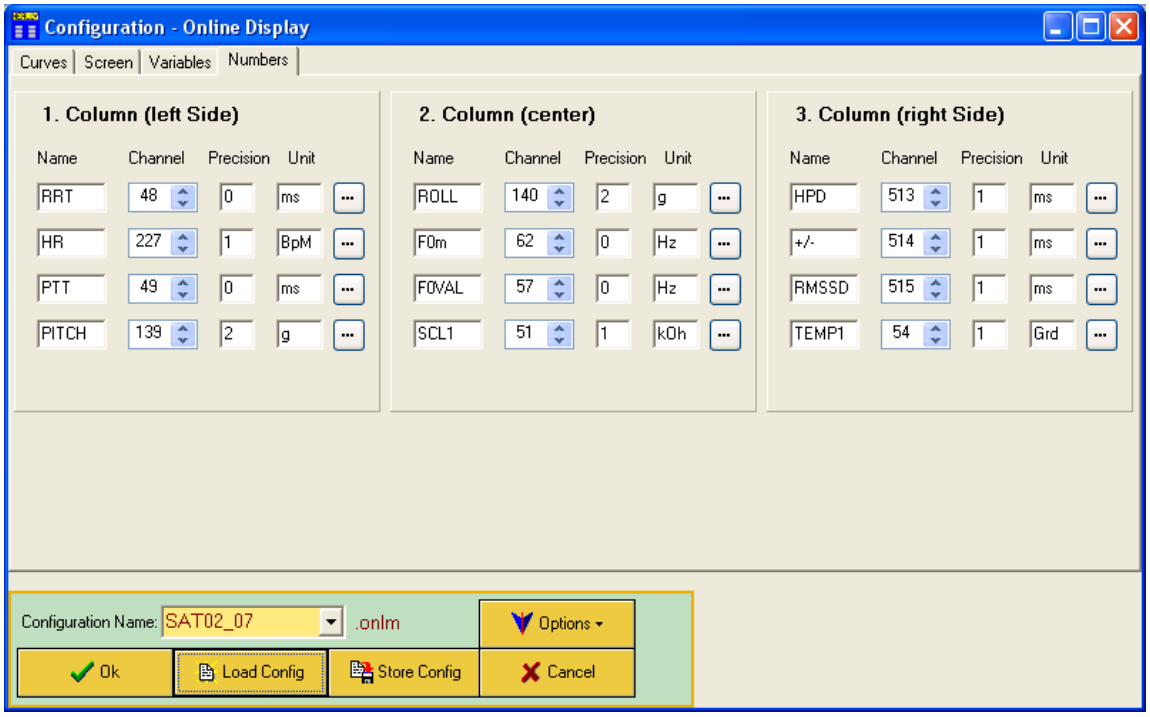
2.1.4.12.2 Tabsheet - Screen



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

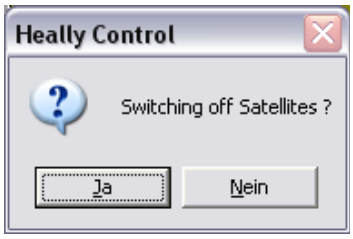
Time interval is an internal parameter (normally 50 to 200 msec, depending on computer performance).

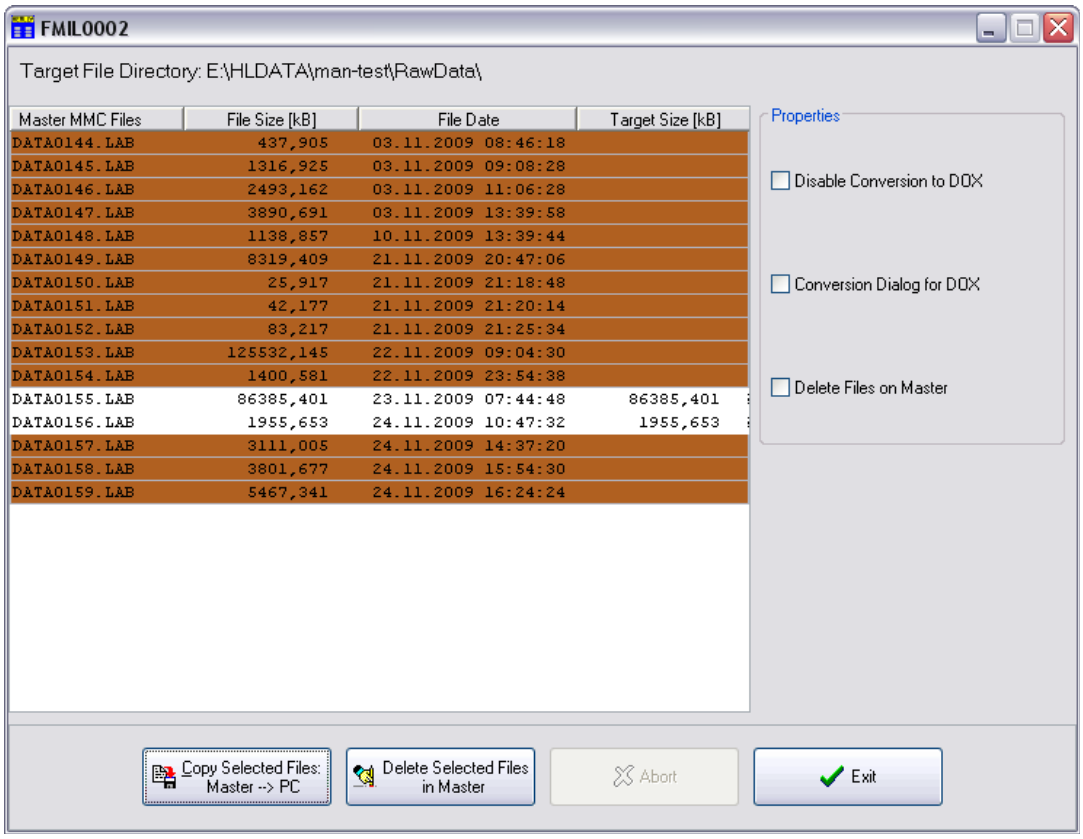
2.1.4.12.3 Tabsheet - Numbers



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 Healy 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*.
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 → 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 *Healy→Configuration→Erase Data in Healy-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.

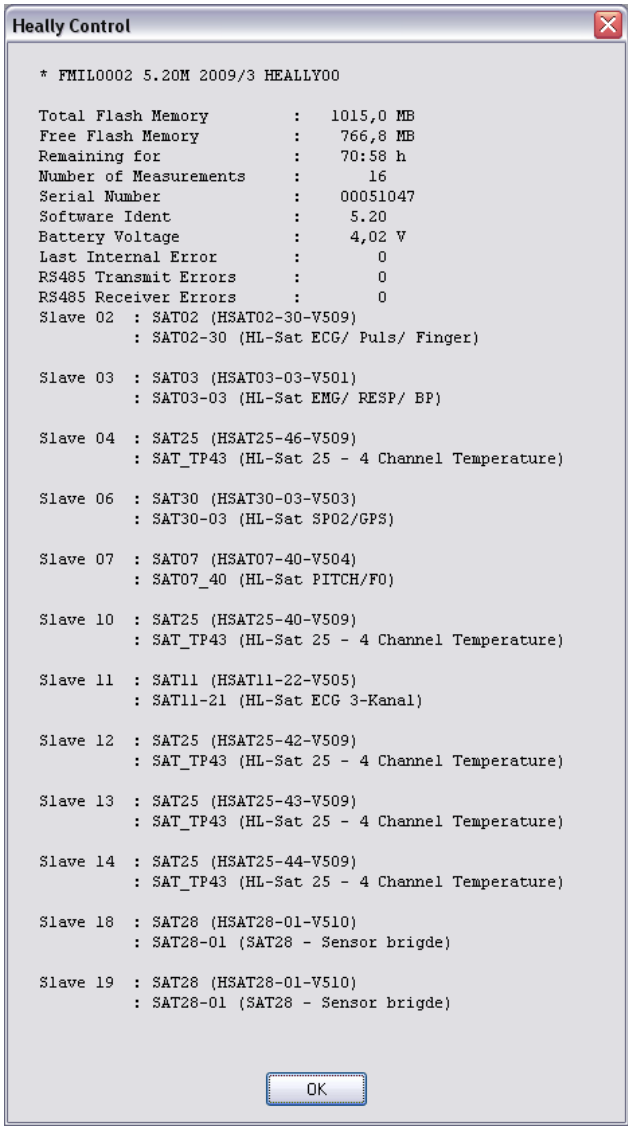
2.1.7 Satellites off

Slaves are powed by master. This button switches the power **line** for the slaves off. Before plugging or unplugging a slave to the Healy-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



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

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.

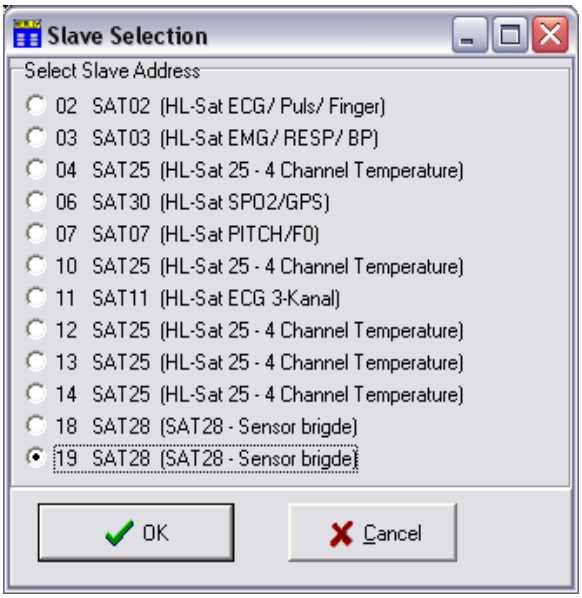
Last Internal Error
Shows number of last error – in case there was one.

Slave Address

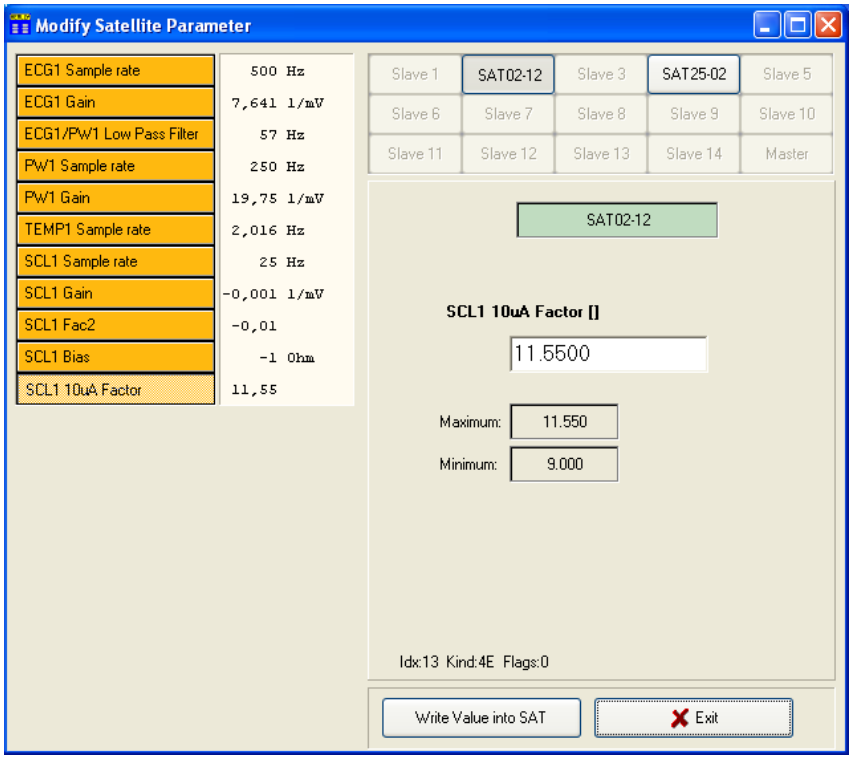
States addresses of existing satellites.

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 *(Modify Satellite Parameter)*.
What is shown within this dialog depends on which satellites are selected and possible settings. The following picture shows an example.



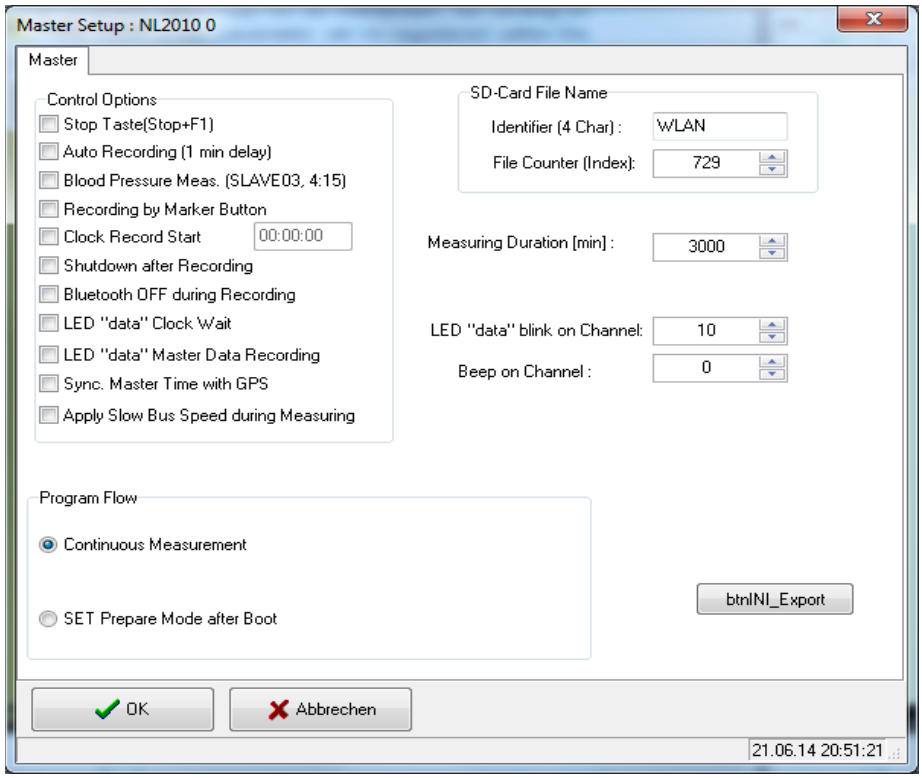
Depending on which button is chosen of the left hand column, details will be stated right referring to sampling rate, strength etc. To change a value the numbers in front and behind the comma may be selected and overwritten. The complete value may not be overwritten. By clicking on the left button *Write 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.



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".

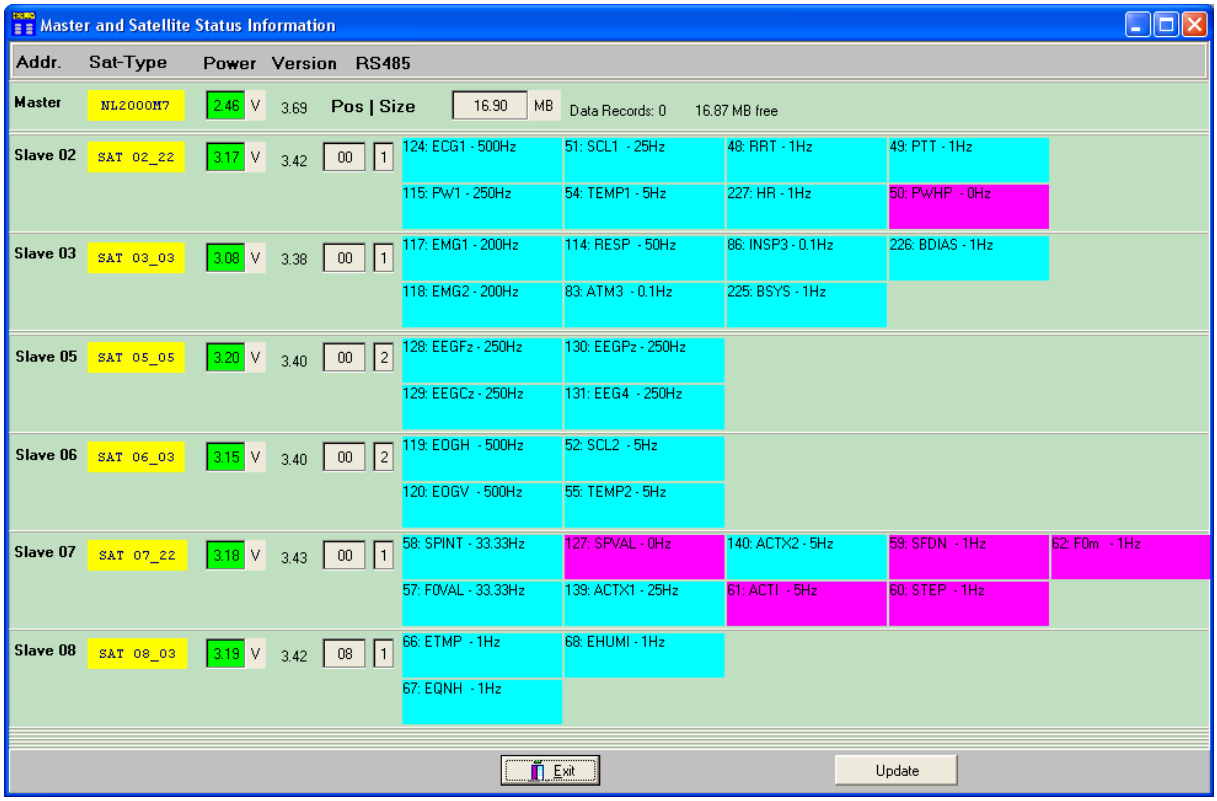
2.2.4 Synchronise Heally Clock

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



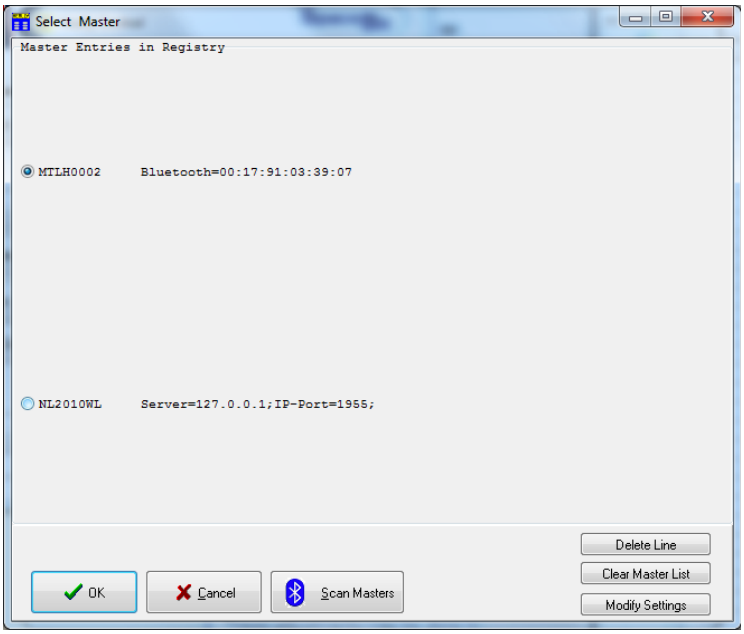
Displays the status of the master, the satellites and their channels. This includes:

- 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 Healy-Master

A dialog to select a master and to change connection properties. The dialog appears also during launch of the Healy 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 Healy–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.



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

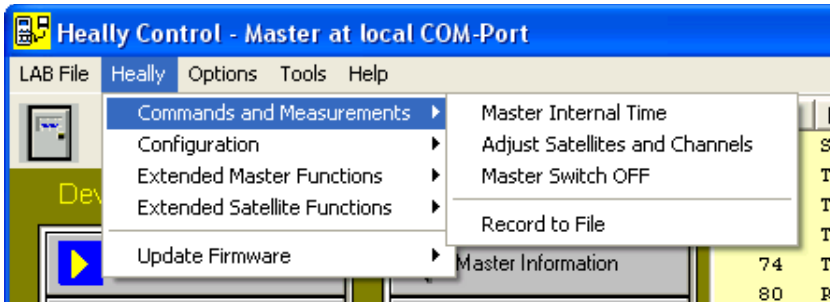
This function includes several steps: Selecting a recorded Lab-File, converting it into DOX-Format with Configuration "Default", OpenDefault“, Open DOX-File in HLExplorer.

3.1.3 EXIT

Exit finishes the program.

3.2 Healy-Function

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

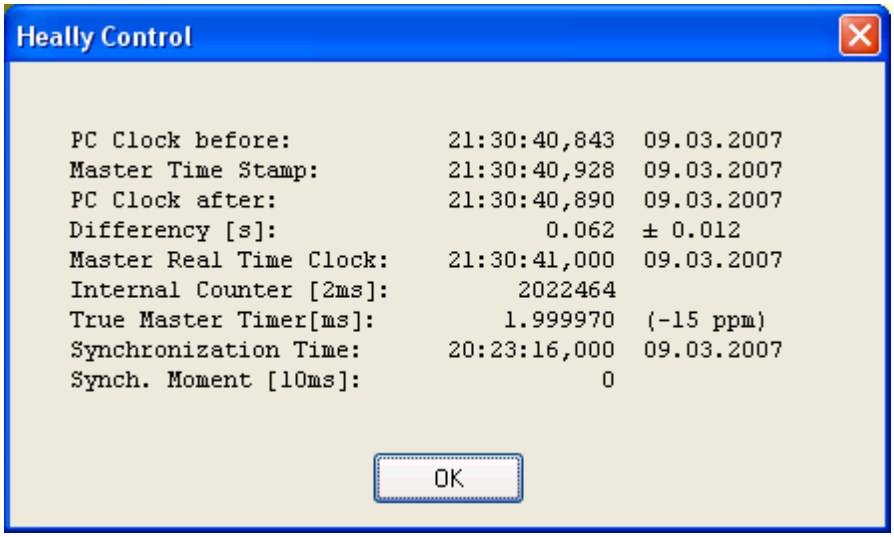


The menu is only active if the program is connected with a *Healy-Master*. It enables to give certain commands to the master or the satellites. It also includes all commands of the main window.

3.2.1 Numerical display

3.2.2 Commands and Status

3.2.2.1 Master Internal Time



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 Healy-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 Healy-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 Healy-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).

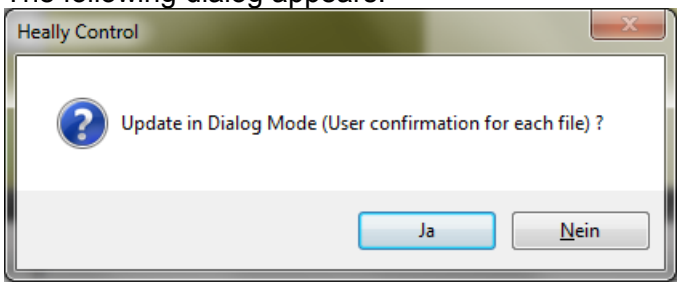
A firmware file may be selected by an Open-Dialog.
In case the firmware is not compatible with the master, a warning message appears. Ignoring this message may destroy the device.

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.

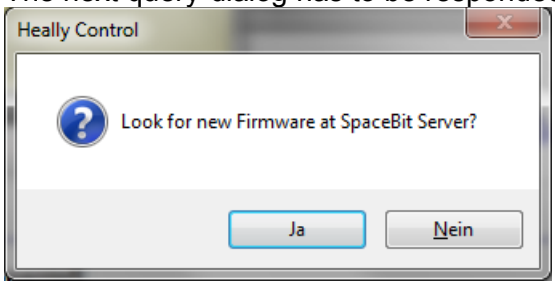
3.3.12 Firmware Update of all Components

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:



“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.

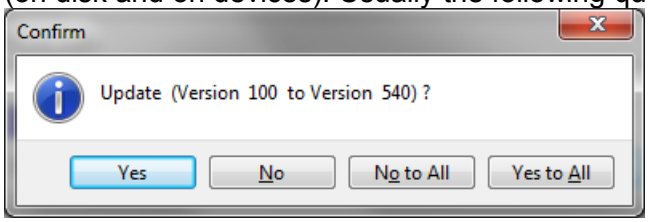
The next query-dialog has to be responded:



“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).

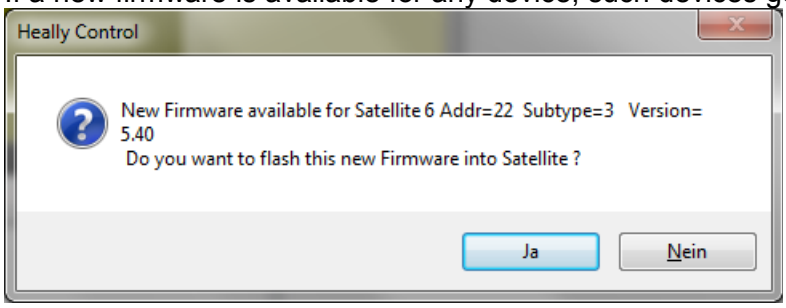
Depending on the answers to the previous queries the update procedure starts.

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:



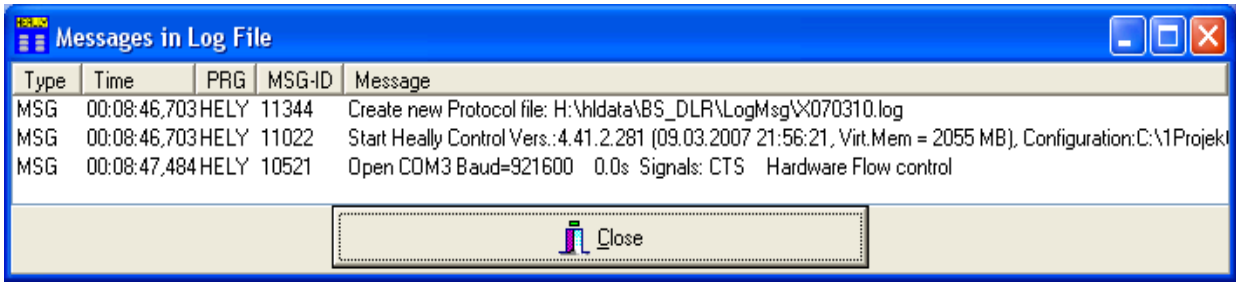
“Yes” : The firmware will be flashed.

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.



3.4.2 Host Settings

Configure an customized startup-display of Healy-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_Healy.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:
https://secure.turboj.de/documents/Healy5_en.pdf