



## ELEPHOR 8S TEST AND CALIBRATION PROGRAM

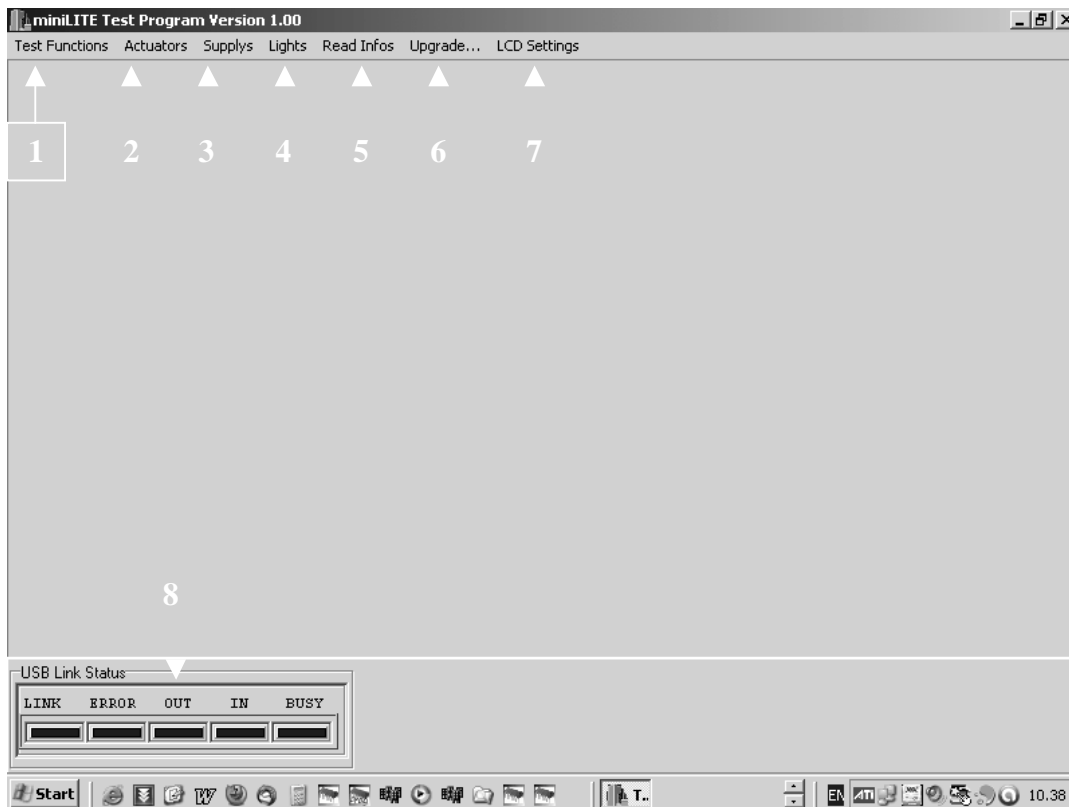
<b>Table of contents</b>	<b>Pag.</b>
Presentation of test and calibration program for the ELEPHOR 8S electrophoresis analyzer	2
Screen test and calibration of movements	3
Calibration procedure of movements	7
Support test mechanical actuators and fluid section	8
Support calibration and test migration power supply	10
Support Test light section	11
Detection and verification of calibration parameters	12
Firmware Upgrade	13
LCD settings	14

## Presentation of test and calibration program for the ELEPHOR 8S electrophoresis analyzer

The test and calibration program "TestMiniLite.exe" was written by the manufacturer to support technicians to have a means by which to carry out functional tests on the various sections which make up the analyzer ELEPHOR 8S . This assumption puts the user (a technician well trained) between a program that communicates with the various sections of the equipment at the lowest level possible in order to be able to detect malfunctions or to perform certain checks of calibration.

The program focuses not on what may be specific interface "user friendly" toward the user must know exactly what each task entails and what kind of feedback should be obtained . The information contained in this manual refer to the technical manual of the instrument for covering the procedures of calibration and verification of electronic cards .

The program shows a main screen accompanied by a series of menus, each of which opens a display of work dedicated to a particular section of the instrument:



1. Placement test and calibration functions
2. Actuators and fluids test section
3. Electrophoresis power supply test
4. Reading light test
5. Check the calibration data and firmware infos
6. Firmware Upgrade
7. Setting LCD strings, language and serial number
8. USB indicators: Link, I/ O Error on USB, Transmission, Reception and Busy

## Screen Test and Calibration handling

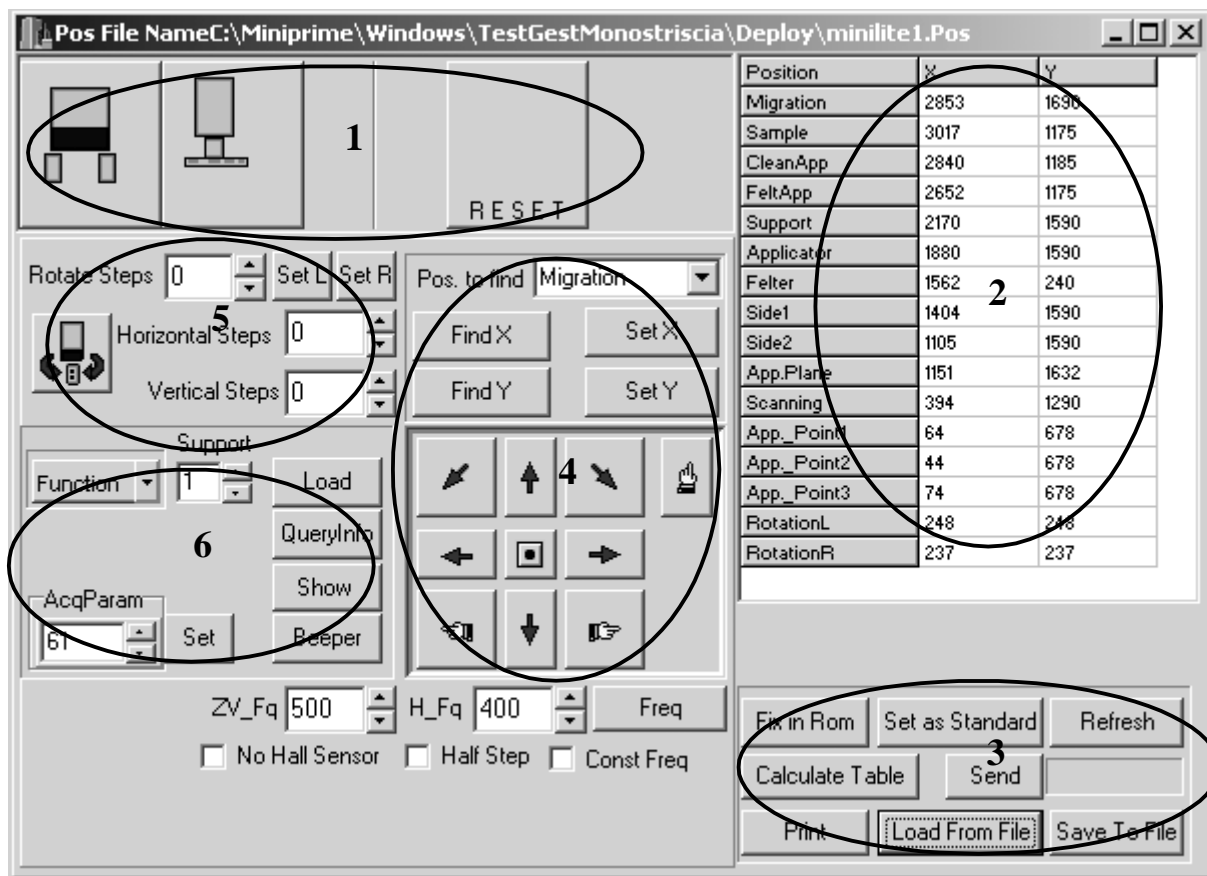
In this screen you can perform a functional check of instrument movements and set the parameters of the mechanical arm positioning. These parameters are expressed in motor steps. There is a definite relationship between the motor steps and the movement summarized in the following wording:

Motor movements in horizontal: 8 motor steps~ 1mm

Vertical movement: 32 motor steps ~ 1mm

Note that there is a factor of 4 between the values that are set vertically and those with the same horizontal displacement.

The screen is organized into several sections:



1. Section activation buttons mechanical gripper, mechanical lead and software reset tool.
2. Grid position values (X, Y) for the mechanical arm (values are in motor pulses)
3. Button sending data to flash-ROM, PC disk storage, printing etc. ..
4. Activation and find positions buttons
5. Text entry boxes values (motor steps) for activation
6. Buttons menu and test functions

Here are the functions of the various sections:

### ***Section 1.***

Mechanical gripper activation button: pressing this the gripper is activated by taking one of two possible states (open, closed) represented by the change of the image affixed to the button itself.

Mechanical lead activation button: pressing this button the lead is activated, assuming one of two possible states (up, down) represented by the change of the image affixed to the button itself.

Reset button: This button will reset the instrument recovering the zero positions of the three motors (vertical, horizontal and rotational).

### ***Section 2.***

This section consists of a grid representing the X, Y coordinates of the various working positions of the mechanical arm.

### ***Section 3.***

This section essentially controls the management of the data contained in the grids described in Section 2 and 5 of its buttons are described below according to what is usually the order of use during a calibration phase:

Refresh button: serves to refresh the structure positions. Before sending data to the instrument with the Send button it's good practice to press this button (especially if you set values manually within the data grid) in order to properly synchronize the data structures that represent the grid values.

Send button: Send tables position to the connected instrument.

Fix in Rom button: send a command to the instrument, which shall store the tables position, previously sent, within the non-volatile memory (flash ROM).

Save To File button: Allows you to store a file on your work computer in order to get a copy easily accessible and restored when the one contained in the instrument were to be lost to malfunctioning of the device flash-rom.

Load From File button: Allows you to load a position table file previously stored

Button Set As Standard: Reserved for future implementations (not used) Calculate Button: Reserved for future implementations (not used)

Print button: You can print on the table positions just found or loaded from files.

### ***Sections 4 and 5.***

These two sections are closely related, their purpose is to receive and test the values of placement locations to be included in the table and have immediate feedback about failures on circuit handling mechanical arm. Section 4 reproduces a panel of movement typical of industrial applications, it consists of:

Recovery Horizontal position

Button recovery location Zero Vertical

Button to the left horizontal displacement

Button to the right horizontal displacement

Button upward vertical displacement

Button-down vertical displacement

Button left rotation

Button right rotation

Pull down menu item to Find on which you select the key positions to be set during a phase of calibration or testing.

Find X Button: Once you set the number of steps by which the engine must move horizontally, pressing this button.

Find Y button: once you set the number of steps by which the engine must move vertically, pressing this button, you get the recovery and subsequent Zero vertical positioning of the clamp to share specified.

Button Set x: set the X value that appears in the box setup horizontal motor steps Section 4 of the grid values (Section 2) the location selected key.

Set Y button: set the Y value that appears in the box set of vertical motor steps in Section 4 of the grid values (Section 2) in selected key position

Section 5 contains the input boxes in which the operator must set the number of steps representing the displacement to be done. Detail in Section consists of:

Rotate Steps: Box input motor rotation steps .

Horizontal Steps: input box horizontal motor steps

Vertical Steps: input box vertical motor steps

The Set button L: Set the value contained in Steps Rotate the grid positions of Section 2 in the position corresponding to clamp horizontally with the fingers gripping facing left (front view )

The Set Button R: Set the value contained in Steps Rotate the grid positions of Section 2 in the position corresponding to clamp horizontally with prehensile fingers pointing right (front view)

Button Recovery Zero rotation: retrieves the location of Zero rotation putting the clamp vertically with the fingers prehensile downwards.

### ***Section 6.***

This section is used primarily to test the operations performed by the analyzer ELEPHOR 8S during a

normal operating cycle, it will highlight the selection box support with which they will operate and the pop-up menu in which the operation must be selected from accomplish. This menu is useful to test the goodness of a calibration subsystem for moving the robotic arm without having to wait for the operating time of a routine electrophoresis, with the added advantage of being able to repeat the same operation several times.

Section 7 consists of:

Support Box: (not used)

Function Button: Clicking the mouse on the tab to this button shows a menu containing the routine tasks performed by the analyzer ELEPHOR 8S ; selecting the desired tool to run when you have finished the current task (if the instrument is running another operation). It is possible to select the same operation several times consecutively perhaps to find particular problems occurred during the execution of the operation during a normal cycle of work.

Button Beeper: reserved (not used)

Show button: Selecting this button after gaining support with the command Scan Support Function menu is displayed on a video screen showing the representation of data read. Unlike the management program "ELEPHOR 8S " this program shows the data as they were read by photo detectors without further processing.

AcqParam Box: Contains the value calculated by selecting Calculate Scan Region in the Function menu. This value, expressed in points, is calculated using special transparent media that is labelled a black line that determines the lower area of support to be eliminated during read .

Set AcqParam button: AcqParam writing a value in the box and pressing this button will manually set the value of the lower cut-in flash memory ROM.

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### **Calibration procedure of movements**

Is now described the calibration procedure of the present work analyzer positions ELEPHOR 8S .

For

simplicity we assume that the instrument has never been calibrated and the values in the positions grid are those "proposed" by the program .

First :

1. select the menu item Support Position of Section 4 (boxes Horizontal and Vertical Steps Steps automatically assume the proposed value)
2. to support the position number 1
3. press the X button Find Section 5
4. press the Y button Find Section 5
5. verify the correctness of positioning and possibly act by increasing / decreasing the number of steps to do, get the position of Zero Vertical and repeat steps 2 and 3 until you reach the optimum value in positioning
6. when the values of Horizontal and Vertical Steps for that position are considered acceptable, press the button and Set Y Set X Section 4 thus enter the values in the corresponding table positions
7. repeat steps 2,3,4,5 and 6 for all the items in the calibration menu Positions

### **Calibration positions wells samples**

This operation is of vital importance for the instrument, because the failure to verify these placements may lead to erroneous statements in the application stage and breaking the same application!

We encourage you to get maximum attention should it be required calibration or verification of these positions by virtue of the fact that it must use the same applicator to get feedback on the positions!

To check or adjust the positions of sera operate as follows:

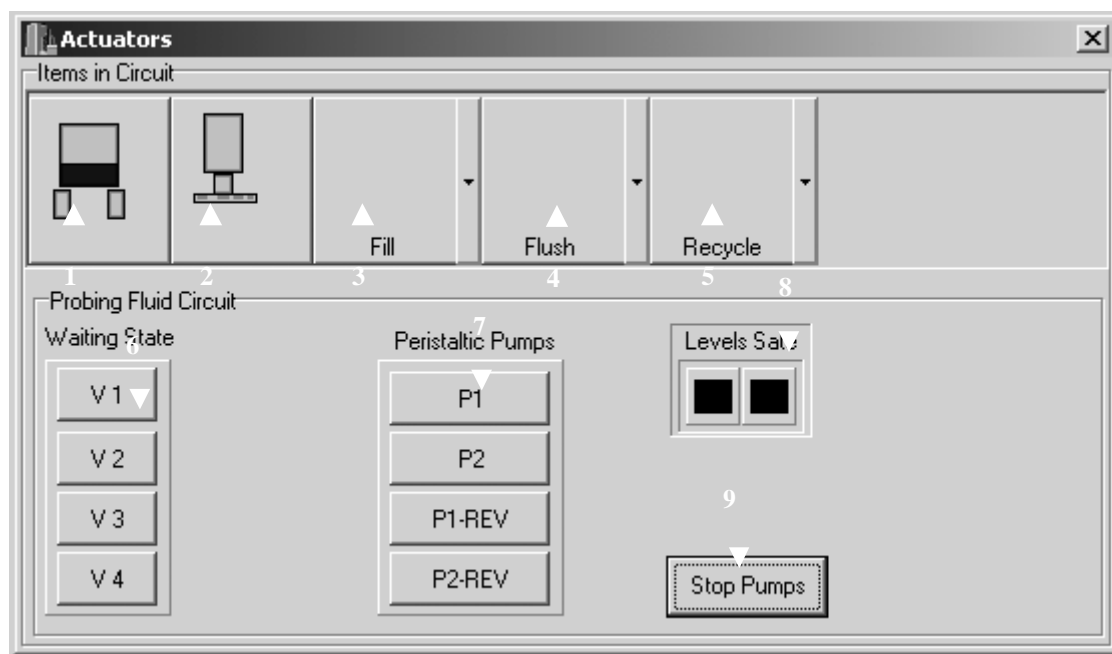
1. Press the Reset button Software Section 1
2. Positions menu to select the Section 4 Applicator
3. Repeatedly press the X button Find and Find Y
4. Press the button activate gripper described in Section 1 (the clamp is closed)
5. Press the button for the recovery of the mechanical arm Zero Vertical
6. Press the button recovery Zero Rotation pneumatic gun
7. Positions menu scroll Sample
8. Press the X button Find
9. Vertical Set Box Steps fewer than 100 steps that proposed and press the Find Y button
10. Check that the blades of the Depositor are centered over the wells of serum, if necessary, retrieve the Zero Vertical, alter the value of Horizontal Steps 8,9,10 and repeat steps until reaching the optimal placement.
11. Check the Find button with the vertical dimension Y
12. Press the button for the recovery of the mechanical arm Zero Vertical
13. From the menu select the Applicator Positions
14. Find X and press the button, the machine stopped, Find Y
15. Press the button to activate pneumatic gripper (the gripper opens and releases the applicator)
16. Press the button recovery Zero Vertical

After all the settings to save files in a position with the Save To File button, press the Send button that will send the new positions of the instrument and stored in the Flash-ROM by pressing the button in Rom Fix Check if the proper functioning of movements through the popup menu button Function of Section 7.

### Test Manager section of actuators and fluids

This screen allows you to test the activities of pinch valves and peristaltic pumps up the hydraulic system of each reagent, and allows you to test the proper activation of the liquid level sensors and Section compressed air (caliper, cylinder, compressor, air valve).

The names of buttons relating to pinch valves and peristaltic pumps is identical to that used in the technical reference manual that you see when wanting to identify their location.



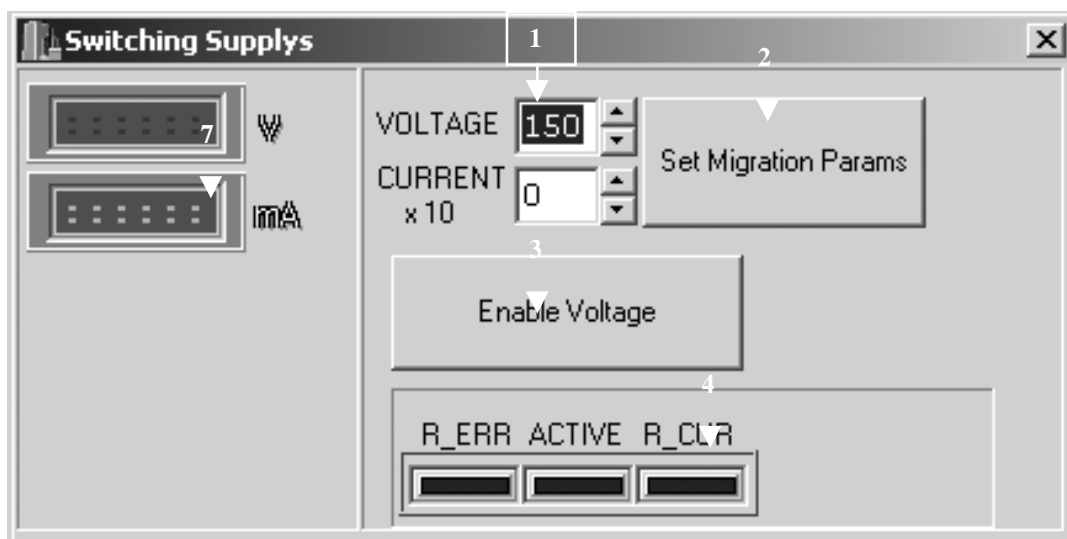
1. Mechanical grip button: change the state of activation of the mechanical grip
2. Mechanical lead button: change activation status of the electrophoretic chamber cover.
3. Button load management fluids (Fill) and test level: pressing the tab button shows a menu of operations containing the following items:
  - Side\_1 voices and Side\_2: single loading tray (1-2) with assistance from the sensors At this stage, the achievement level in the tank choice illuminates the corresponding position on the panel 10.
  - For side\_2 you can choose the type of reagent to load (or STAIN DESTAIN)
  - Item All Sides: Start a simultaneous loading of two containers with assistance from the level sensors (SIDE\_2 = STAIN).
  - Voice Probe Only: performs a test for detection of liquid level provides the status panel 10 (liquids are not loaded)
4. Button flush reagents, washing circuit (Flush): Pressing the tab of this button displays an operation menu containing the following items:
  - Item Side\_2: flush the compartment 2
  - Recycle + Clean: recovers liquid in position 1 and 2 (only if Side\_2 = STAIN) and finally performs a washing circuit reagents.
5. Recovery button reagents (Recycle): Pressing the tab button that shows a menu operations containing the following items:
  - Side\_1 items, Side\_2 (STAIN) recovery in the corresponding single liquid tank
  - All Sides: concurrent liquid from either chamber
6. Fluid selector valve : pressing V1-V4 buttons we'll have the selection of the corresponding channel from the fluid selector (Stain, Destain, Clean, Waste)



7. Panel activation peristaltic pumps: This panel consists of a set of buttons each of which appears to be associated with a peristaltic pump circuit specific reagents.
  - P1: button peristaltic reagent tank 1 in load
  - P2: peristaltic reagent tray button 2 in load
  - P1-REV: button peristaltic reagent tank 1 in recovery
  - P2-REV: button peristaltic reagent container 2 in recovery / flush
8. Panel status level liquid: when you do the load the state of liquid level is shown on this panel.
9. Pumps Stop: This button stops all peristaltic pumps that are active

### Test power supply for electrophoresis and Peltier cell

This screen allows you to set values useful for calibration and test power supply for electrophoresis and test the correct operation of the cell Peltier effect is used for temperature control of samples.

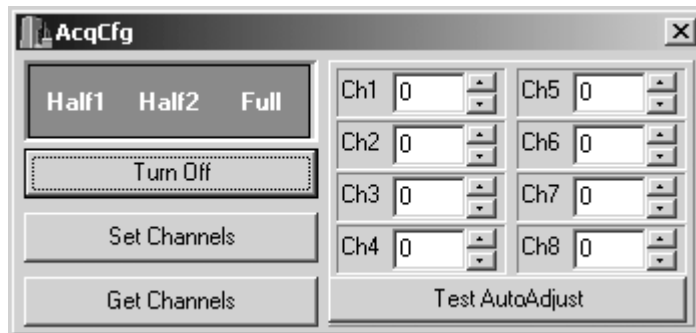


**Note: please consult the section of the technical manual for the calibration of the inherent power supply**

1. Box input voltage migration: this box allows you to set the voltage on the power supply to regulate migration during a phase of calibration or testing. The value to set for a calibration adapter for electrophoresis is equal to 150 (volts). If you set a nonzero value in the box below is ready for the power supply constant current, in which case the current value to be paid shall be indicated by a factor of 10  
Ex: 100 = 10mA.
2. Set Migration Params button: sends the value set in boxes 1 to the ELEPHOR 8S analyzer on the regulation DAC.
3. Voltage Enable Button: Enables the output of the electrophoresis and delivers the power connector on the set of electrophoretic chamber. Further press disables the output of the pulling tension as well.
4. Flags state power to migration:
  - R\_ERR = error adjustment
  - ACTIVE = Powered On
  - R\_CUR = constant current output

### Test section reading lights

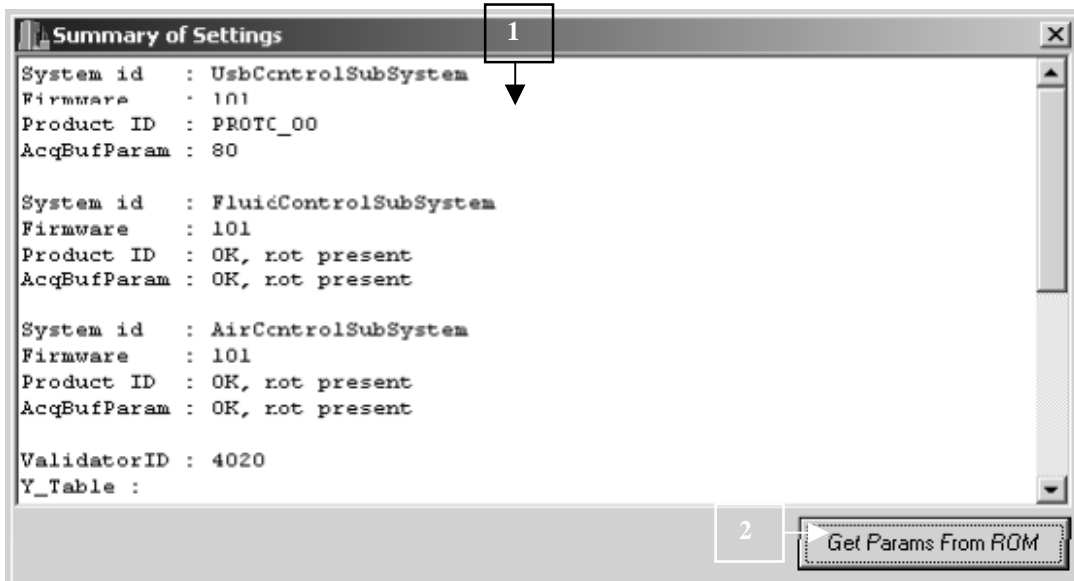
This screen head activation LED reading and helps to calibrate the data acquisition card and the card power LED (see special section on the technical reference manual for the stages of adjustment).



1. Half1 button: not used
2. Half2 button: not used
3. Full-button: activate all LEDs
4. Turn Off Button: Off all LEDs
5. Set Channels : sets LED's channels intensity according to the values specified into the respective boxes
6. Get Channels : load LED's channels intensity values from the analyzer.
7. Test Auto Adjust : Do an Auto Calibration of LED's channels.

### Check / call handling data section

This screen allows you to recall all the calibration data for the instrument connected to the computer.



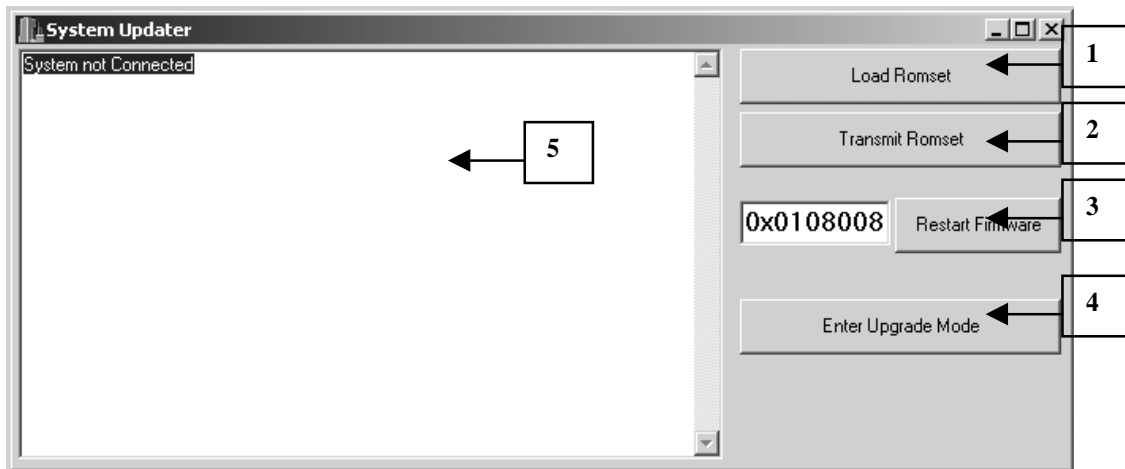
1. Panel information: on this panel appear all the information on this firmware version in to ELEPHOR 8S , and the calibration tables in summary form.
2. Button GetParams from Rom: The purpose of this button is to draw the calibration data described above from flash memory Rom instrument on which work.

**Note: Before making any change in the calibration data in the tool must be downloaded through this screen and save to a file via the Save To File menu Test Functions.**

### Firmware Update Microcontroller subsystems

This screen is a console with which you can upgrade the firmware in the three subsystems Microcontrollers (Airsystem, FluidSystem and ControlSystem).

At this stage you get feedback on this screen if you're upgrading one of the three subsystems.

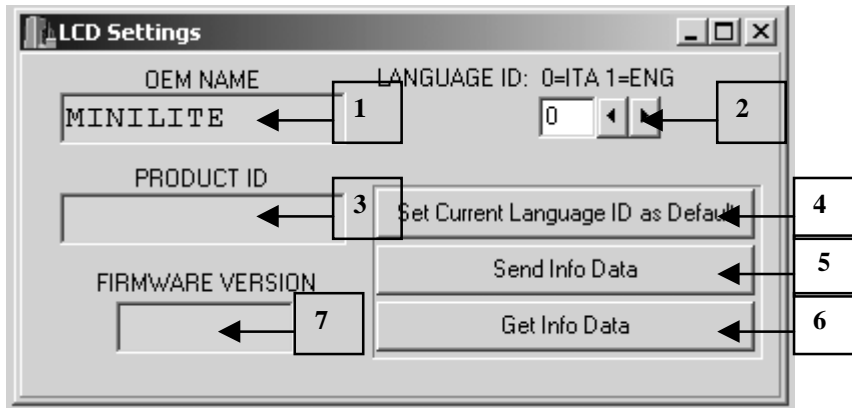


1. Button Load Romset : it's used to specify a new firmware to send to the analyzer.
2. Transmit Romset: press this button to start the update process.
3. Button Restart Firmware: Restart the firmware .
4. Button Enter Upgrade Mode : set the analyzer in update mode for receiving the new firmware.
5. Console: This box contains all messages and errors about the current upgrade operation.

**Note: the upgrade operation is quite critical and must be addressed only when absolutely necessary. In case of programming errors or sudden voltage drop during this phase, the system that was planning goes into protection and automatically starts the update utility every time you turn on the instrument, that in order to reset the data gone lost. In such situations the system that was planning is blocked. To restore just operate as described above.**

## LCD Settings

This option sets some strings displayed on the LCD of ELEPHOR 8S . This is done in the factory setting of the same language and serial number of the instrument.



1. Input box for entering an OEM name
2. Language selector
3. Input box for entering the serial number
4. Set the selected language on the analyzer
5. Send all displayed infos to the analyzer
6. Get all data from the analyzer

### Note: Do not alter serial numbers, it's a factory-set!

The only option described here is the language setting, as the screens are set at the factory and should not be altered without the written consent of INTERMEDICAL Srl

To reset the language on the display to change the value in the language ID (0 = Italian, English = 1), press the button Set Language ID as Default.

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