

SpiroSoft

Service Manual

2014847-009

Revision C



GE Medical Systems
Information Technologies

gemedicalsystems.com

NOTE: The information in this manual only applies to the SpiroSoft. Due to continuing product innovation, specifications in this manual are subject to change without notice.

Caution:

During repairs/service interventions, observe the protective measures against damage due to ESD.

GE Medical Systems Information Technologies considers itself responsible for the effects on safety, reliability, and performance of the equipment, only if:

- assembly operations, extensions, readjustments, modifications, or repairs are carried out by **GE Medical Systems** Information Technology or by persons authorized by **GE Medical Systems** Information Technologies,
- the electrical installation of the relevant room complies with the applicable national and local requirements, and
- the instrument is used in accordance with the instructions for use.

This manual contains service information; operating instructions are provided in the operator's manual of the instrument.

This manual is in conformity with the instrument at printing date.

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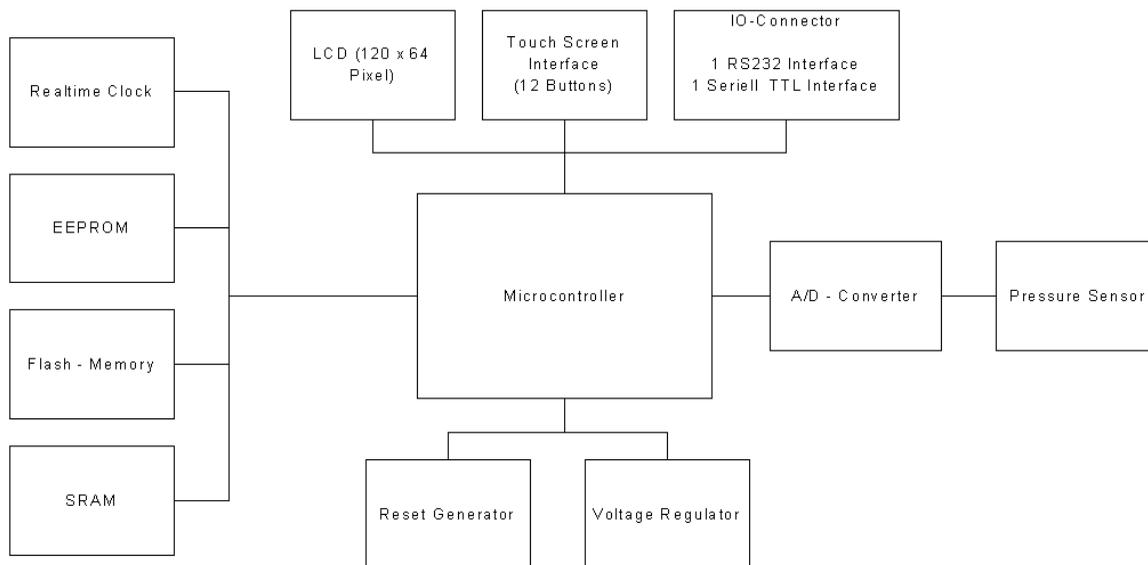
Revision History

This manual is subject to the *GE Medical Systems Information Technologies (GEMS IT)* change order service. The revision code, a letter that follows the document part number, changes with every update of the manual. The initial version of the manual has the letter A.

Table 1. Revision History		
Part No./Revision Code	Date	Comment
2014847-009 A	2003-07	Initial version
2014847-009 B	2003-12	ECO 075536
2014847-009 C	2005-05	ECO 080514

1 Block Diagram

Block Diagram

SpiroSoft **SPF55204**

2 Functional Description

The SpiroSoft System consists of a 16-bit microcontroller with an integrated Flash program memory.

The peripheral components are a real-time clock backed up by GoldCap, which, when the device is turned off, retains the time for a minimum of 5 days, an EEPROM which stores the data of the pressure sensor used and the SpiroSoft settings, as well as a Flash memory which stores the texts, the bitmaps and the database.

SpiroSoft has a reset generator which resets SpiroSoft, if the voltage drops below the 2.5-Volt threshold. The voltage is supplied from a 3.0 Volt low-dropout regulator; a 6.1-Volt Transil diode provides transient overvoltage and reverse polarity protection.

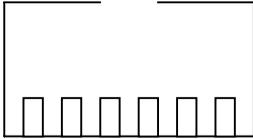
A piezoresistive pressure sensor sampled by a serial 16-bit A/D converter with integrated measuring bridge determines the measuring value by acquiring the pressure drop across the PT.

3 Names of Signals

none

4 Pin Connections

Both the communication and the voltage supply take place via the 6-pin connector of SpiroSoft. The pin assignment is as follows.



1	VCC	supply (3.6 Volt to 5 Volt)
2	RXD	V24 data line
3	TXD	V24 data line
4	GND	ground
5	IO/1	IO line TTL
6	IO/2	IO line TTL

5 Instrument Options

None

6 Instrument Version

The current hardware is version HW1.0.
The current software is version FW1.0.1.

7 Pictures

7.1 Serial Number

The serial number of the device is located under the lid of the battery compartment.



8 Firmware Loading Procedure

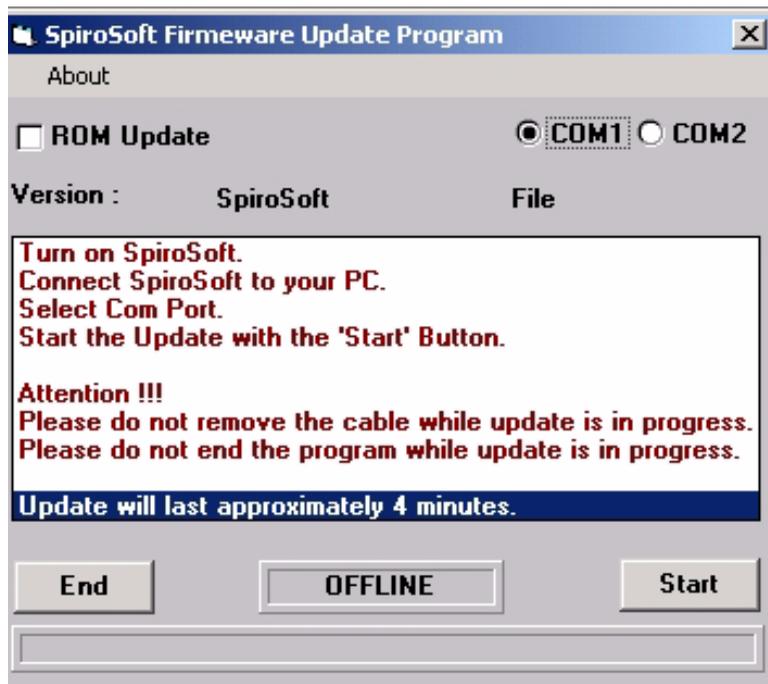
8.1 Standard Update

The firmware updated is supplied in the form of a zipped file named “SW FIRMWARE SPIROSOFT FW102.zip” (2014848-002).

To begin with, unpack the zipped file.

Connect SpiroSoft to the PC, using the connection cable.

Then start the update procedure with the program SW FIRMWARE SPIROSOFT FW102.exe.



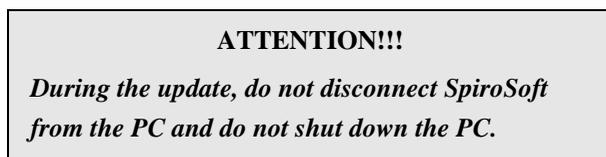
Select the COM port where SpiroSoft is connected and click the Start button to initiate the update.

If the firmware version of the SpiroSoft is newer than the update version, the following window appears.



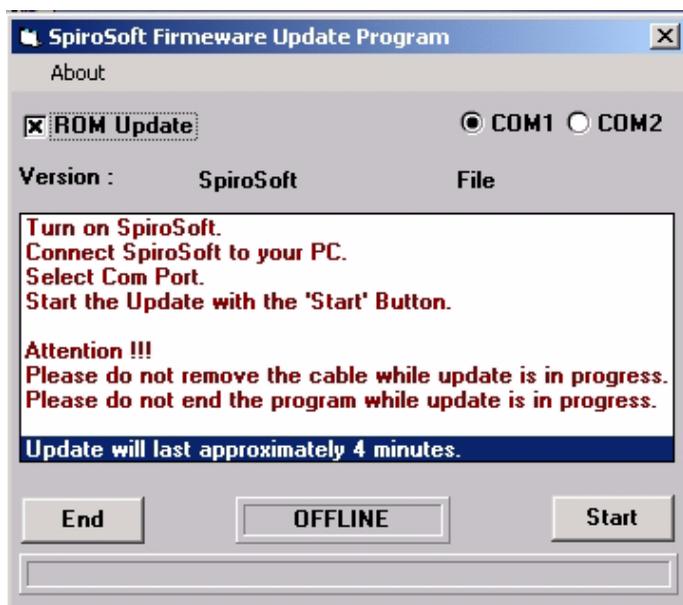
Pressing “OK” starts the update, pressing “Abbrechen” stops the update.

The update procedure is fully automatic, no further user interventions are required.



During the update, the following message appears on the display of SpiroSoft: “Download Microcontroller Program”.

After the update, you will see the message “Download OK! Please remove the PS/2 connector for at least 3 Seconds”.



Select the COM port where SpiroSoft is connected, select the “ROM Update” option and click the Start button to initiate the update.

The update procedure is fully automatic, no further user interventions are required.

After the update, you will see the message “Download OK! Please remove the PS/2 connector for at least 3 Seconds”.

Press “OK” and click “End” to terminate the update program.

Remove the PS/2 connector for at least 3 seconds.

Then reconnect: SpiroSoft will start up with the new firmware version.

9 Diagnosis Codes / Error Codes

The following diagnosis/error codes can be displayed on the PC (CardioSoft).

Message	Cause
Error in spirometer setup! Please check the settings!	The ambient conditions entered are incorrect; therefore the correction factor is out of range.
Zeroing of the spirometer was not successful, probably you inhaled prematurely. Please repeat the test!	The system could not be zeroed before a measurement. This may be due to one of the following reasons <ul style="list-style-type: none"> – The patient breathed into the sensor while the system was zeroed. – The tubing to the pressure transducer was squeezed between the parts of the enclosure after a repair.
Data obtained cannot be analyzed. Please repeat the test!	The test was aborted; therefore the system is unable to find data that can be analyzed. In forced tests, this will be the case when no expiration with a volume greater than 100 ml has been found. In slow spirometry tests, this will be the case when <ul style="list-style-type: none"> – less than 5 respiratory cycles have been recorded – the max. VC is found in the first 5 respiratory cycles (before the beep) – the measured VC is less than 0.5 l – the maneuver took less than 8 seconds.

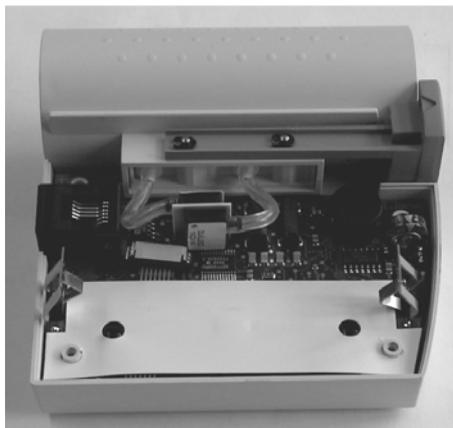
Other possible problems:

Problem	Cause
No information displayed on SpiroSoft	<ul style="list-style-type: none"> – PC not turned on- – SpiroSoft not correctly connected to the PC – No functioning firmware in SpiroSoft (see 8.2)
No values are displayed during the measurement, or the displayed values are only inspiratory or only expiratory values.	<ul style="list-style-type: none"> – The PT is not properly locked in SpiroSoft – The silicone tubing to the pressure transducer was squeezed between the parts of the enclosure after a repair – The seals of the tubing inside SpiroSoft are damaged.
SpiroSoft does not respond	<ul style="list-style-type: none"> – If SpiroSoft does not respond any more, disconnect the PS/2 cable of SpiroSoft from the PC for about 3 seconds. Afterwards, SpiroSoft will restart the firmware.

10 Adjustment Instructions

SpiroSoft does not contain components that require maintenance or can be repaired. Defective devices should be returned to GEMS IT Repair Center for repair.

10.1 Interior View



11 Jumper Table

None

12 Technical Specifications

Dimensions:	150 x 94 x 40 mm (h x w x d)
Weight:	150 g
Operating voltage:	3.0 V to 5.0 V
Power consumption:	60 mA max.
Measuring principle:	JAEGER "High-Quality" pneumotach
Interface:	serial (RS 232)
Measuring range:	
PEF	0.1 to 16 l/s
FEV1 and FVC	0.1 ... 8 l
Resolution:	
PEF	5 ml/s
FEV1 and FVC	1 ml
Accuracy:	
PEF	+/-3 % / 0.4 l/s
FEV1 and FVC	+/-3 % / 0.05 l
Resistance:	2 kPa max. at 15 l/s
Environment:	
Operation	
temperature	+10 to +40 °C
humidity	10 to 90 %, no condensation
atmospheric pressure	600 to 1200 hPa
Transport and Storage	
temperature	-20 to +50 °C
humidity	10 to 95 %, no condensation
atmospheric pressure	500 to 1200 hPa
Medical device:	CE0123

13 Technical Inspections

None

14 Spare Parts

The following spare parts and accessories can be ordered for SpiroSoft.

Item Description	Item Number
SPARE SPIROSOFT BATTERY COVER	2014846-009
CABLE SPIROSOFT - PC	2014846-002
SPLY PNEUMATACH W MOUTHPIECE #10	2014846-003
SPLY NOSECLIP #25	2014846-008
SPLY MOUTHPIECE #25	2014846-006
SPLY PAD FOR NOSECLIP #100	2014846-007
MNL OPR SPIROSOFT	2014847-001
RCDR SPIROSOFT	2014846-001
RCDR SPIROSOFT EXCHANGE	2014846-010
PACKAGING BOX SPIROSOFT	2014846-005



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