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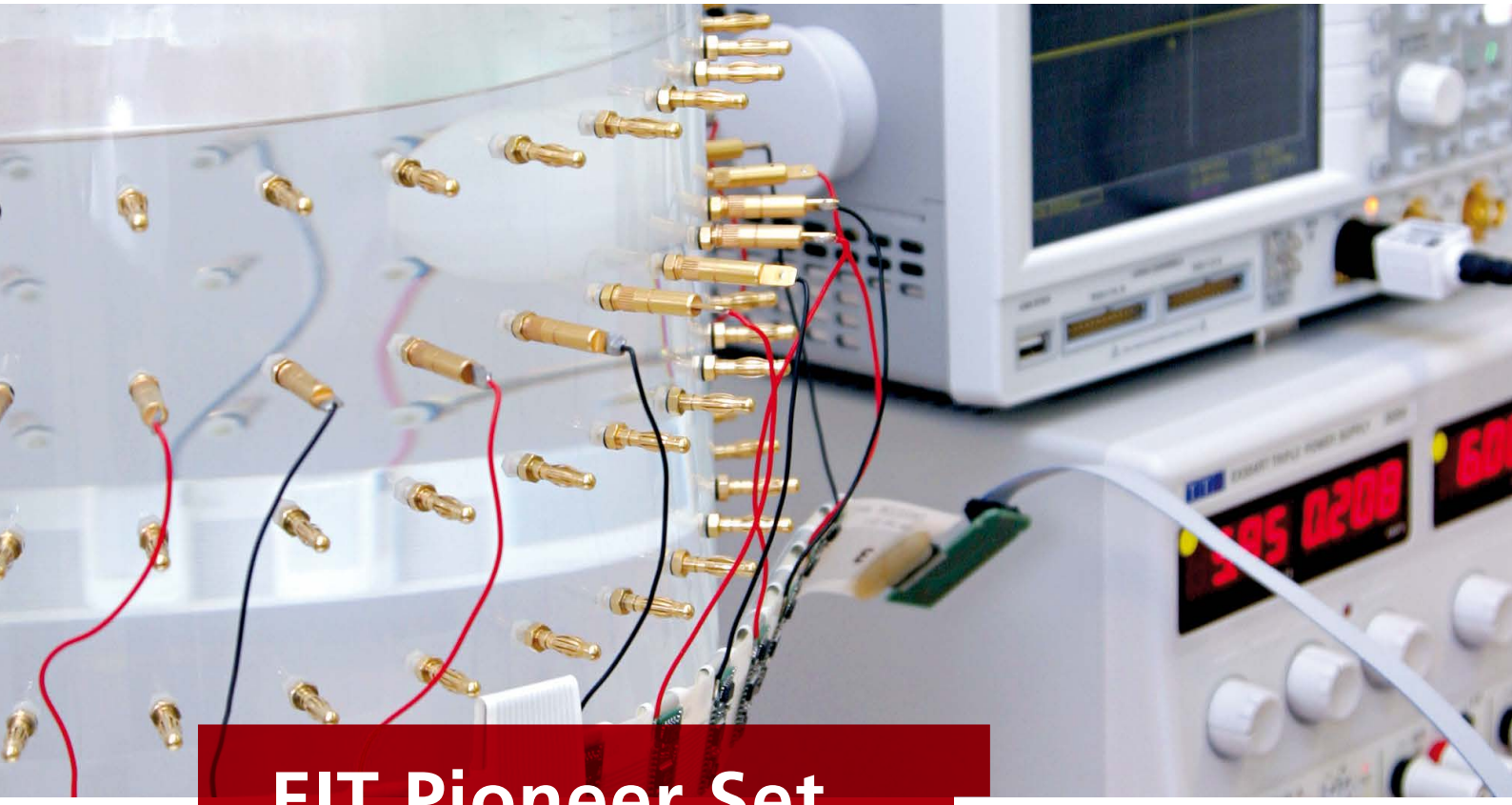


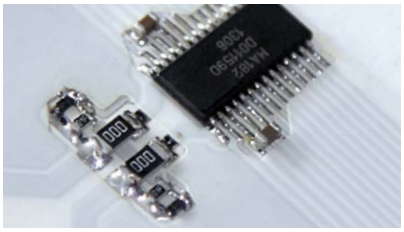
EIT Pioneer Set

Made in Switzerland to foster Open Innovation EIT Research worldwide

1ST500-102, Rev. 006

Real-time tomographic images for organ function monitoring and diagnosis

eit inside
electrical impedance tomography



Active electrodes
The Pioneer Set contains 16 double-channel "EIT Chips" which interface with the attached 32 electrodes and manage the electronic signals on site.

Highly integrated electronics
Current injection, voltage signal de-modulation, and artifact rejection are done by the electronics inside the smart SensorBeltConnector.

Be a Pioneer!

To advance the development of EIT in general and to accelerate clinical EIT applications, Swisstom has started the Open Innovation EIT Research Initiative. As a first step Swisstom provides a plug-and-play EIT hardware and software package, the "EIT Pioneer Set", exclusively for the EIT research community.

Tools for EIT Pioneers

- EIT advanced interface with 16 double-channel „EIT Chips" and a break-out cable to attach 32 electrodes.
- One smart SensorBeltConnector with sophisticated miniaturized electronics (FPGA-based) and software to handle the large amount of data and to output the results via an Ethernet connection
- A power and data communication interface with wall power A/C adapter
- Complete documentation of the data transfer format
- External synchronisation in- and output
- Image creation is done subsequent to data acquisition on any commercial PC attached to the Pioneer Set
- Unique Swisstom EIT Monitor (STEM) software provided under the General Public License (GPL)

EIT advanced interface

The EIT advanced interface contains complete SensorBelt hardware which can either be connected to a resistor phantom simulating the human thorax or to external electrodes using a break-out cable. The impedance distribution in the phantom can be changed manually, automatically or by external signals. For experimental use an external electrode arrangement can be attached to the EIT advanced interface. More details can be found in the technical data sheet of the EIT advanced interface.

EIT Pioneer Set – Technical Specifications

Intended use:
The following set of EIT hardware and software components of the EIT Pioneer Set are intended for laboratory applications, exclusively. **They must not be used on humans!**

The Pioneer Set consists of the EIT advanced interface with 32 channels, a smart SensorBeltConnector, a power supply unit and data communication documentation.

EIT advanced interface
- 16 double-channel EIT chips
- 50-250 kHz AC current application
- Resistor phantom with manual action buttons, adjustable impedance change patterns, external impedance-change controls (pressure and voltage)

PC and software requirements
- Windows 7 recommended
- Minimum Java 1.7

Smart SensorBeltConnector
- Programmable injection current 1 to 7 mA peak
- Programmable injection current frequency 50 kHz-250 kHz AC
- Up to 1 kOhm load impedance
- Freely programmable injection patterns
- High resolution, high speed data acquisition
- Differential and absolute voltage measurement
- 1 to 80 data frames per second (programmable)
- Connector to Interface module

Interface module
- Frame synchronisation output, sync input
- Power management for SensorBelt and SensorBeltConnector
- Provides 4 kV galvanic isolation of SensorBeltConnector
- Synchronization signal

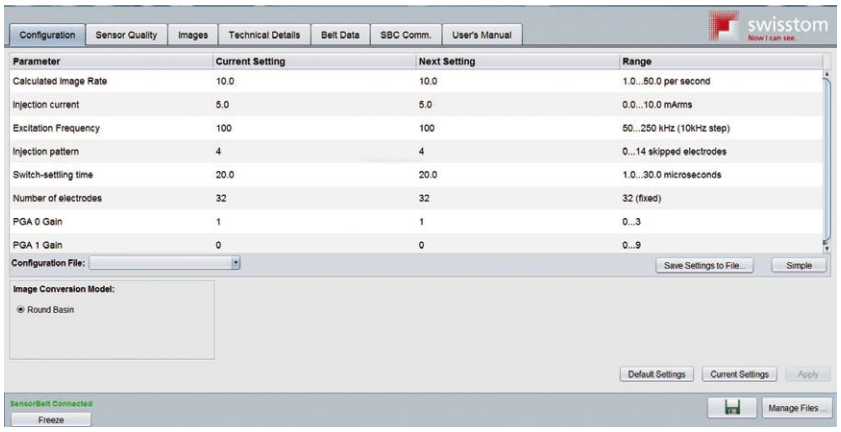
A/C adapter
- 100 – 240 VAC 50/60 Hz

Data communication documentation
- Definition of data streams which include IQ demodulated data
- Description of programming capabilities

STEM Software: Full disclosure to enable Open Innovation

The STEM software runs on Windows PCs and communicates with the components of the EIT Pioneer Set. STEM allows setting EIT parameters such as image rate, excitation frequency, injection current and other technical parameters via the Ethernet connection.

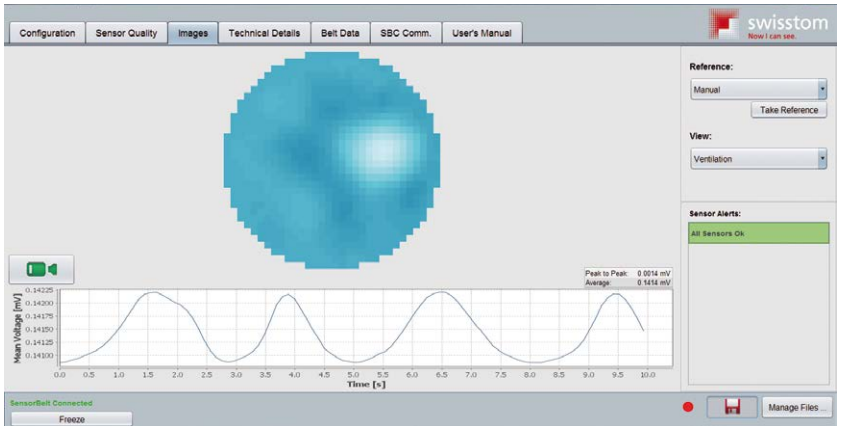
STEM provides real-time monitoring of the signals and continuous quality checks of each one of the electrodes. Storage of raw data is done at user request and in a format that is completely disclosed to enable every conceivable post-processing and signal analysis. The source code of STEM can be downloaded at the company website.



Selected screen shots of the STEM software

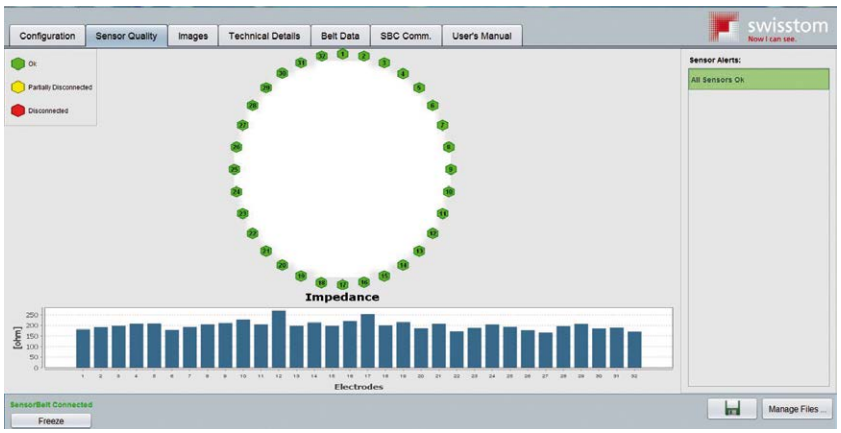
Configuration

Allows the user to set all operational parameters such as excitation frequency, switch-settling time, injection pattern, injection current and image rate.



Image

Reconstructed images are shown in real-time. On the bottom the composite signal of the sum of all measured voltages is displayed.



Sensor quality

Visualizes the status of all 32 electrodes in colors green, yellow and red together with respective location. Bar graphs below show contact impedance value for each electrode.

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Who are we?

Swisstom AG, located in Landquart, Switzerland, develops innovative medical devices to monitor lung and heart function (and their interactions) of patients in ICUs and during general anesthesia. Swisstom's unique EIT system is characterized by:

- Active electrodes for high signal quality
- Easy to handle single cable connection via Ethernet
- Fully programmable scanning patterns and signal acquisition
- Built-in demodulation
- Composite electrode impedance measurement
- Synchronisation signal

Find out more about Swisstom and its upcoming products under www.swisstom.com!

What do we do?

We build and support a worldwide Open Innovation EIT Research Network of dedicated EIT researchers and EIT pioneers. This multidisciplinary network consists of experts in clinical, physiological and technical EIT as well as specialists in EIT-related mathematics and algorithms research. Our research partners have committed to providing software components and tools that are fully compatible with the Pioneer Set while we as a company commit to making our devices fully compatible with such software by delivering our current data in a fully disclosed data format.

What can you do?

This initial set of components is for lab applications only and not for patient use. Many researchers worldwide already provide software tools that are fully compatible with the Pioneer Set. Join the Open Innovation EIT Research Initiative. Share your ideas and make your software available (i.e. via EIDORS) for others to use and improve.

You are cordially invited to join this Open Innovation Initiative!

Price list

Pioneer Set
7'990.- EUR
(STEM Software included)

Spare parts

- SensorBeltConnector replacement 4'738.- EUR
- Interface Module replacement 1'635.- EUR
- AC Adapter replacement 210.- EUR
- EIT test adapter (ETA) 1'635.- EUR
- EIT advanced interface for experimental use 3'285.- EUR
- Resistor mesh phantom 585.- EUR
- Custom-made experimental belts on request
- Water tank phantom on request
- Electrode extension cable (custom)

Contact us!
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Made in Switzerland

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DESIGN AWARD 2015

1ST500-102, Rev. 006

Real-time tomographic images for organ function monitoring and diagnosis

eit inside ® electrical impedance tomography