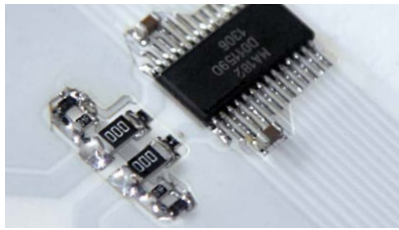


## SenTec EIT Pioneer Set

Made in Switzerland to foster Open  
Innovation EIT Research worldwide



#### Active electrodes

The SenTec EIT Pioneer Set contains 16 double-channel "EIT Chips" which interface with the connected 32 electrodes.



#### Highly integrated electronics

Current injection, voltage signal demodulation, and artifact rejection are done by the electronics inside the Pioneer Connector.

## Be an EIT Pioneer!

To advance the development of EIT in general and to accelerate clinical EIT applications, SenTec, after having acquired and subsequently merged Swisstom into SenTec, decided to continue Swisstom's Open Innovation EIT Research Initiative. SenTec, consequently, continues to offer for sale the „EIT Pioneer Set“ formerly provided by Swisstom and now referred to as „SenTec EIT Pioneer Set“.

### Tools for EIT Pioneers

- EIT Advanced Interface with 16 double-channel "EIT Chips" and a break-out cable to connect 32 electrodes.
- Pioneer Connector 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 SenTec EIT Pioneer Set
- Unique SenTec EIT Monitor Software (STEM Software)

### EIT Advanced Interface

The EIT Advanced Interface 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.

## SenTec EIT Pioneer Set – Technical Specifications

#### Intended use:

The hardware and software components of the SenTec EIT Pioneer Set are intended for laboratory applications only. The SenTec EIT Pioneer Set is not a medical device and, consequently, is not intended for clinical use on humans.

**The SenTec EIT Pioneer Set consists of the EIT Advanced Interface with 32 channels, a Pioneer Connector, a Pioneer Interface Module, an AC-Adapter 12V 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

#### Pioneer Connector (Pioneer LMC Sync or Pioneer SBC Sync)

- 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 Pioneer Interface Module

#### Pioneer Interface Module

- Frame synchronisation output, sync input
- Power management for Pioneer Connector and connected electrodes
- Provides 4 kV galvanic isolation of Pioneer Connector
- Synchronization signal

#### AC-Adapter 12V

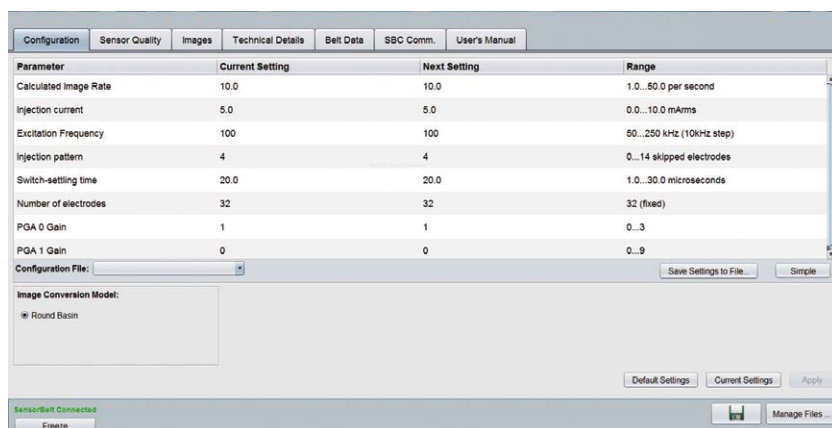
- 100 – 240 VAC 50/60 Hz

#### Data communication documentation

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

## SenTec EIT Monitor Software (STEM Software)

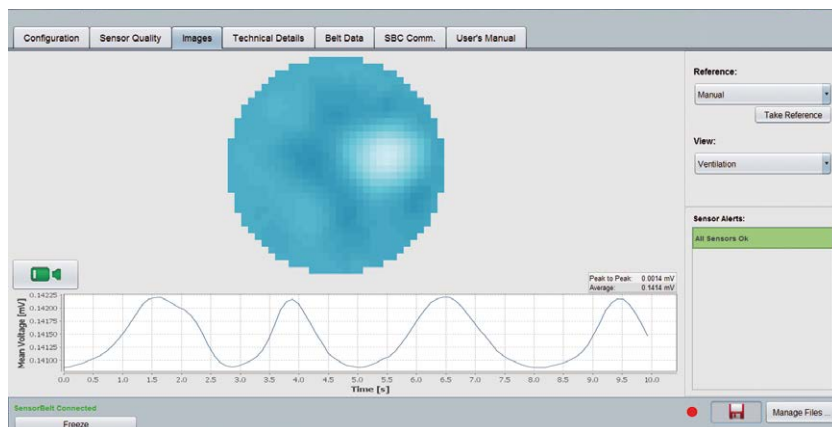
The STEM Software runs on Windows PCs and communicates with the components of the SenTec EIT Pioneer Set. The STEM Software allows setting EIT parameters such as image rate, excitation frequency, injection current and other technical parameters via the Ethernet connection. The STEM Software provides real-time monitoring of the signals and continuous quality checks of each of the 32 electrodes. Storage of raw data is done at user request and in a format that is completely disclosed to enable data post-processing and signal analysis. The source code of the STEM Software is available from SenTec upon request.



Selected screen shots of the STEM Software

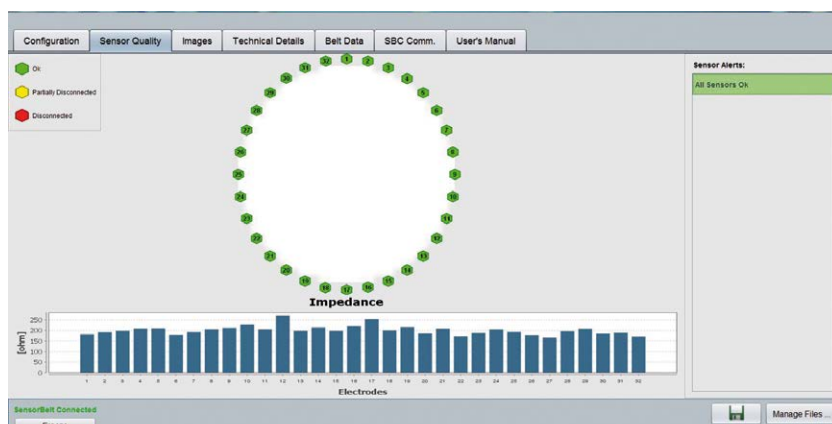
### Configuration

Allows the user to set various 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 sum of all measured voltages, the so-called composite signal, is displayed.



### Sensor quality

The location and connection status of each of the 32 electrodes is visualized in green (connected), yellow (partially connected) or red (disconnected). Bar graphs, furthermore, display the contact impedance of each electrode.

## General conditions for the use of the SenTec EIT Pioneer Set

SenTec is offering for sale the SenTec EIT Pioneer Set with an aim to foster Open Innovation in EIT Research worldwide. SenTec, consequently, encourages users of the SenTec EIT Pioneer Set to publish results, which are made by using the SenTec EIT Pioneer Set.

At the same time, however, SenTec needs to be protected against the risk that new inventions using the SenTec EIT Pioneer Set result in intellectual property rights that might block SenTec's business. SenTec, therefore, sets forth the following conditions for use of the SenTec EIT Pioneer Set.

### General conditions for use of the SenTec EIT Pioneer Set

The purchase and use of the SenTec EIT Pioneer Set and the use of Information (as defined below) is subject to the following conditions:

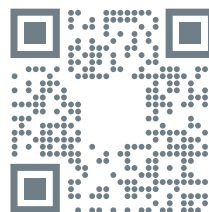
- 1) If the user of the SenTec EIT Pioneer Set makes any Improvement (as defined below), the user of the SenTec EIT Pioneer Set agrees to grant and hereby grants to SenTec, as to the Improvements and possible Intellectual Property Rights relating to the Improvements, a non-exclusive, irrevocable, worldwide and royalty-free license to use such Improvements in context with SenTec's EIT business and SenTec's EIT Products. For the avoidance of doubt, the user shall have no obligation to provide SenTec with information or assistance in context with Improvements or their use.
- 2) For a period of eight (8) years after the purchase of the SenTec EIT Pioneer Set, the user of the SenTec EIT Pioneer Set agrees to not, directly or indirectly, solicit, promote, sell, rent, develop or manufacture any products that compete with SenTec's current or future EIT products. Direct competition is assumed in particular by products using/incorporating EIT data/ technology and/ or by products providing noninvasive monitoring of regional lung function, minute ventilation, tidal volume, and respiratory rate.
- 3) Correct mention of the product names and software versions (where applicable) of SenTec products in any publication, poster or presentation including results, which were made by using the SenTec EIT Pioneer Set.
- 4) In case the user intends to transfer the SenTec EIT Pioneer Set to any third party, the user shall make sure that such third party agrees in writing to only use the SenTec EIT Pioneer Set under the present conditions and shall impose these conditions onto such third party by a written document signed by the third party.

### Definitions

"Information": In this context, the term "Information" shall mean any information about the format or form or content of data, which are provided, displayed or output by the SenTec EIT Pioneer Set.

"Improvement": In this context, the term "Improvement" shall have the following meaning:

- (i) Results that are made or discovered on the basis of or by using Information or the SenTec EIT Pioneer Set or
- (ii) anything derived from such results.



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