SensorBeltConnector (SBC)

Component of the Pioneer Set

Intended Use

The hardware and software components of the EIT Pioneer Set are intended for laboratory applications, exclusively. They must not be used on humans! Set-up and use of the components is the sole responsibility of the user.

Specifications

The function of the SensorBeltConnector (SBC) is to drive a connected SensorBelt P60 and to measure the voltages generated on the test object. The SBC is divided into two elements: the Matchbox (MB) and the Controlbox (CB), see Figure 1. Figure 2 shows a block diagram of the SBC. Connections on the left of Figure 2 lead to the SensorBelt, connections on the right of Figure 2 lead to the Interface Module.

Swisstom AG

The vision of Swisstom AG is to become a globally active and leading provider of life saving, non-invasive medical technology for patient monitoring – to the benefit of patients, physicians, caregivers and society.

Swisstom AG was founded in Landquart (Switzerland) in September 2009 by Josef X. Brunner, Stephan H. Böhm and Peter Seitz. Swisstom AG develops innovative medical devices for the monitoring of lung and heart function in ICU patients and patients undergoing general anesthesia. End-users include physicians (primarily intensivists and anesthesiologists) and other health care professionals.

Unlike traditional tomographic methods, Swisstom´s imaging is driven by electrical impedance tomography (EIT). This technology will serve Swisstom as a platform for future product developments.

Figure 1: Sensor Belt Connector
Connects the SensorBelt with the Interface Module, provides injection currents, drives the daisy chain, measures electrode potentials, demodulates the potentials, receives and transmits synchronisation singnals.

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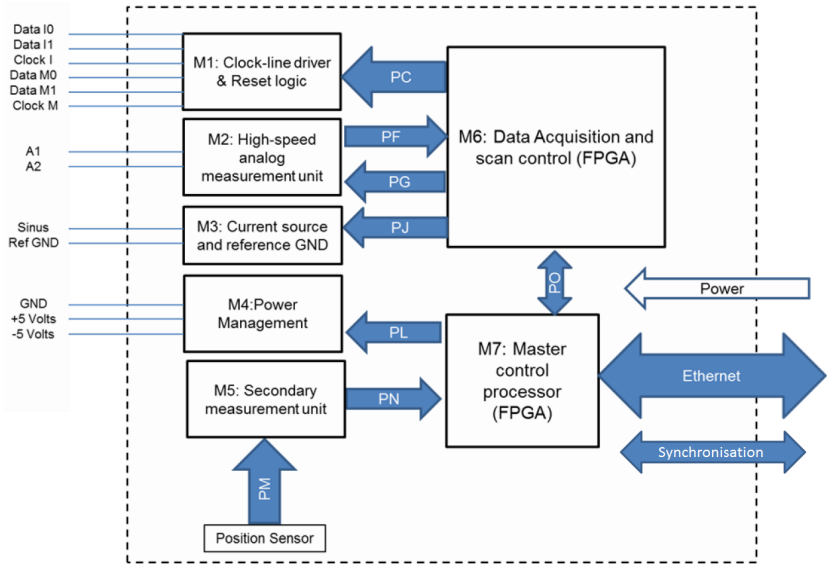

Figure 2: Block diagram of the SensorBeltConnector (SBC). The left connections lead to the SensorBelt, the right connections lead to the Interface Module.

Abbreviation Figure 2	Explanation
M1	This is the digital interface to the daisy-chain. M1 drives the clocks I and M as well as the other digital signals of the daisy-chain.
M2	Measures the difference between A1 and A2 plus the difference between A1 and GND with variable gain amplifier and converts to digital (A/D)
M3	Provides current at a frequency and amplitude determined by the FPGA through a D/A converter and creates a reference ground signal.
M4	Provides supply power to the EIT-Chips, digital ground and analog ground
M5	Secondary measurement unit measures location in space (gravitational vector and drives an indicator LED).
M6	Provides data demodulation, current wave form and amplitude, and digital control signals for the EIT-Chips.
M7	Control units with Ethernet protocol.
PC	Control signals to drive the daisy-chain
PF	Measurements as output of the ADC (Analog-Digital-Converter)
PG	Control signals for the measurement unit (gain control)
PJ	Sinus generation for the DAC (Digital-Analog-Converter) and control signals (gain control)
PL	Provision of power for the BeltBus
PN	Communication interface to secondary control unit
PO	Communication interface inside FGPA
PM	Position sensor

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Now I can see.

Specifiation Table

Symbol	Parameter	Min	Typ	Max	Unit
Power Supply					
V_{CC}	Supply voltage	5.5	6	6.5	V
V_{EE}	Supply voltage	-5.5	-6	-6.5	V
I_{CC}	Current		1000		mA
I_{EE}	Current		500		mA
Current injection					
$f_{injection}$	Frequency of injecting current	50	n.a.	250	kHz
Input instrumentation amplifier					
f_{input}	Input frequency range	50	n.a.	250	kHz
V_{CM}	Input Common Mode Voltage	V_{EE}+0.2		V_{CC}-0.2	V
PGA0	Gain settings of 1st stage (1)	1	n.a.	10	
PGA1	Gain settings of 2nd stage (2)	0.2	n.a.	157	
Operating temperature					
T_{AMB}	Range	+10		+50	°C

(1) Discrete stages 1,2,5,10
(2) Discrete stages 0.2, 1, 10, 20, 30, 40, 60, 80, 120, 157

For more information

Call: +41 (0) 81 330 0914

mail: info@swisstom.com

Or visit: www.swisstom.com

Swisstom AG

Schulstrasse 1

CH-7302 Landquart, Switzerland