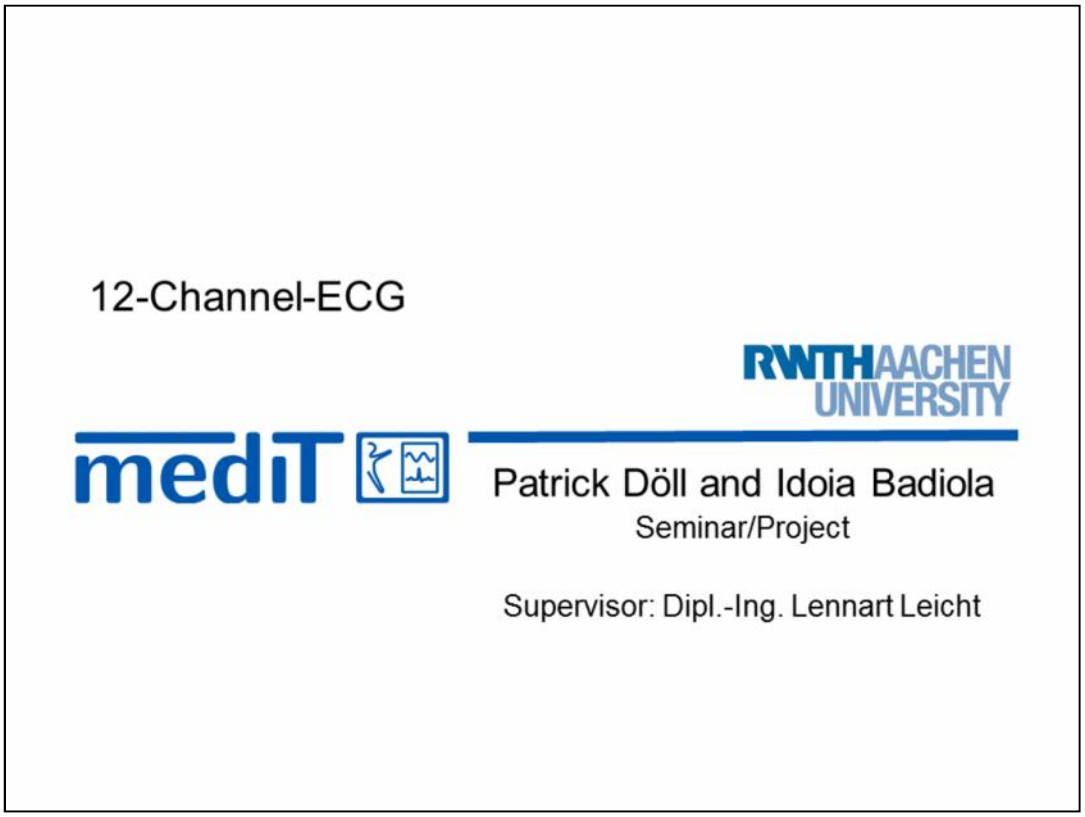
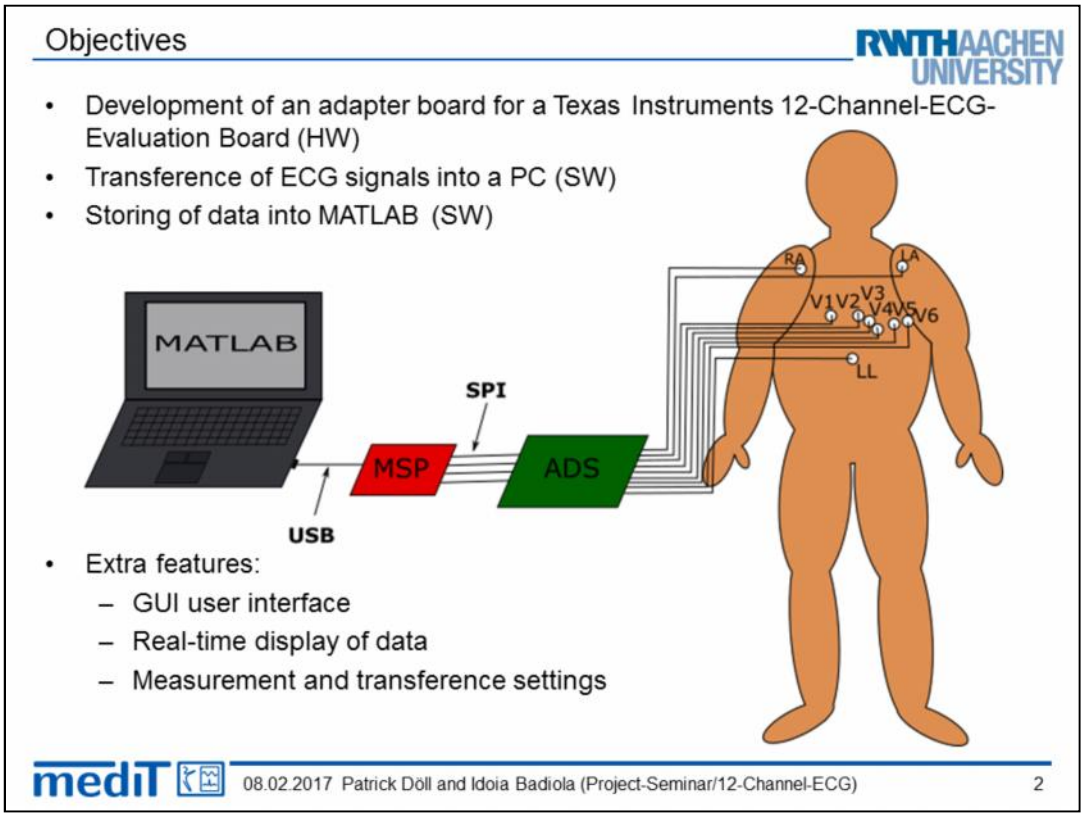


Good afternoon,

I am Patrick Döll, a third-year Bachelor student of Electronics and this is the defense of my seminar. I'm Idoia, a first-year Master student of Electronics and, for me, it is the defense of my project, which deals with the transferring and storing of 12-Channel-ECGs.

Our supervisor was the Diplom Engineer Lennar Leicht



So the main objectives of the project are the ones above:

We started out of the Texas Instruments ADS Evaluation Board and we had to develop an adapter board, through which data could be sent to and stored by Matlab.

So, this project contained both hardware and software parts:

First of all, we had to decide which microcontroller we wanted to use in order to communicate the board and the computer.

And secondly we had to handle the transference of data into the computer and the storing of data.

The features below are some improvements we have added to the project, which we will explain later.

Hardware

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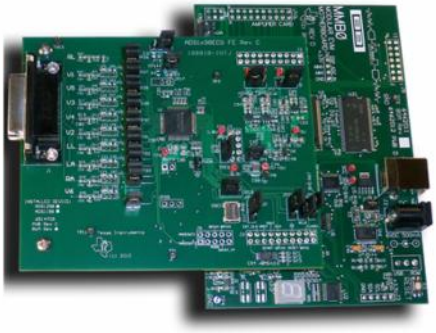

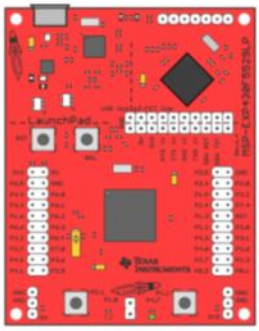

Feature	ADS1298ECG FE
Speed	Up to 2.25 MHz
Data rate	Up to 32000 SPS (HR)
Resolution	Up to 24 bits
Serial communication	SPI
Extra features	Programmable gain
	Normal measurement, Noise measurement, Tpre measurement, Test signals

Feature	MSP-EXP430F5529LP
Speed	Up to 25 MHz
Non-volatile memory	128 kB Flash
RAM	8 kB
Timers	4x 16-bit
Serial communication	2 I2C, 4 SPI, 2 UARTs
ADC channels	12-bit SAR, 16 channels
Extra features	USB
Price	$12.99

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So, as we have said: there are both hardware and software and we're going to start with hardware.

So, this is the Texas Instruments board, which takes all the data from the electrodes connected to this port. As you can see, it offers quite a wide range of types of measurement and can be connected through SPI.

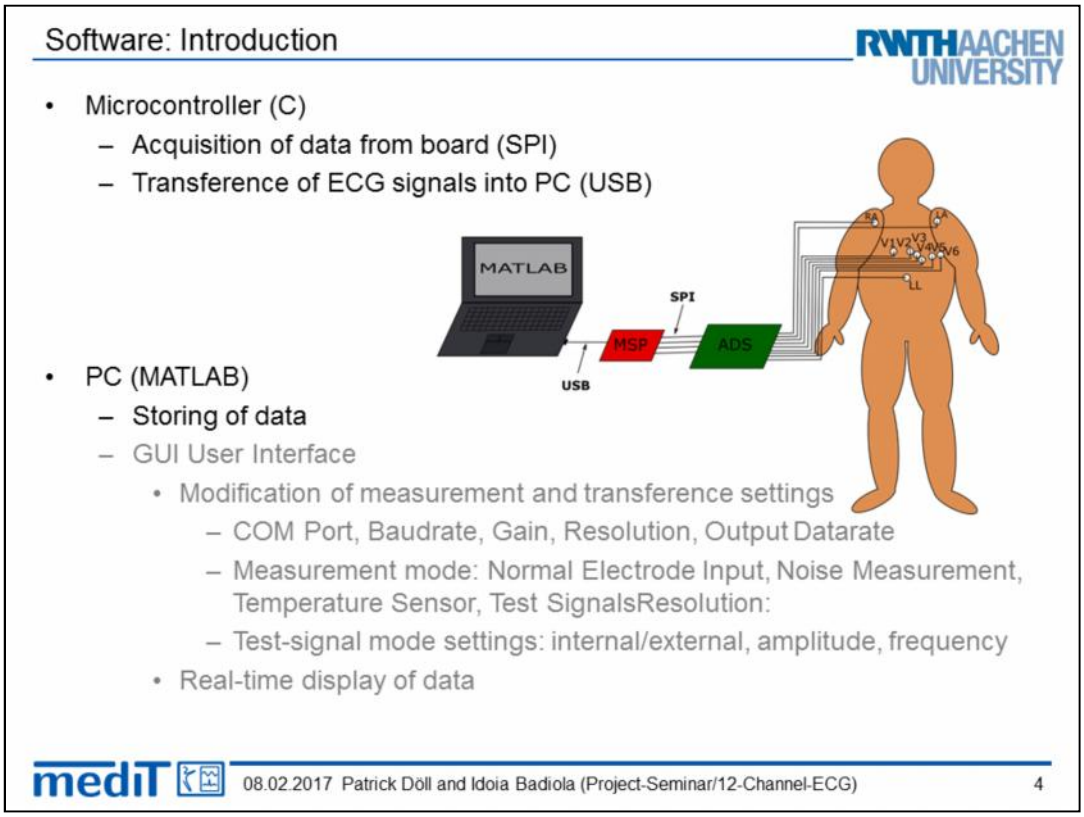
We decided to choose this board (show with pointer laser) among other possibilities (which are contained in the CD too) for many reasons:

First of all, our supervisor already had this board, so we didn't have to purchase it

Secondly, it also allowed SPI communication and it's easily connectable to the computer through USB.

And of course, the clock-speed was enough for data to be sent at the correct rate.

Apart from that, we also had to design and produce a simple adaptive board (which you can see here) in order to couple both boards.



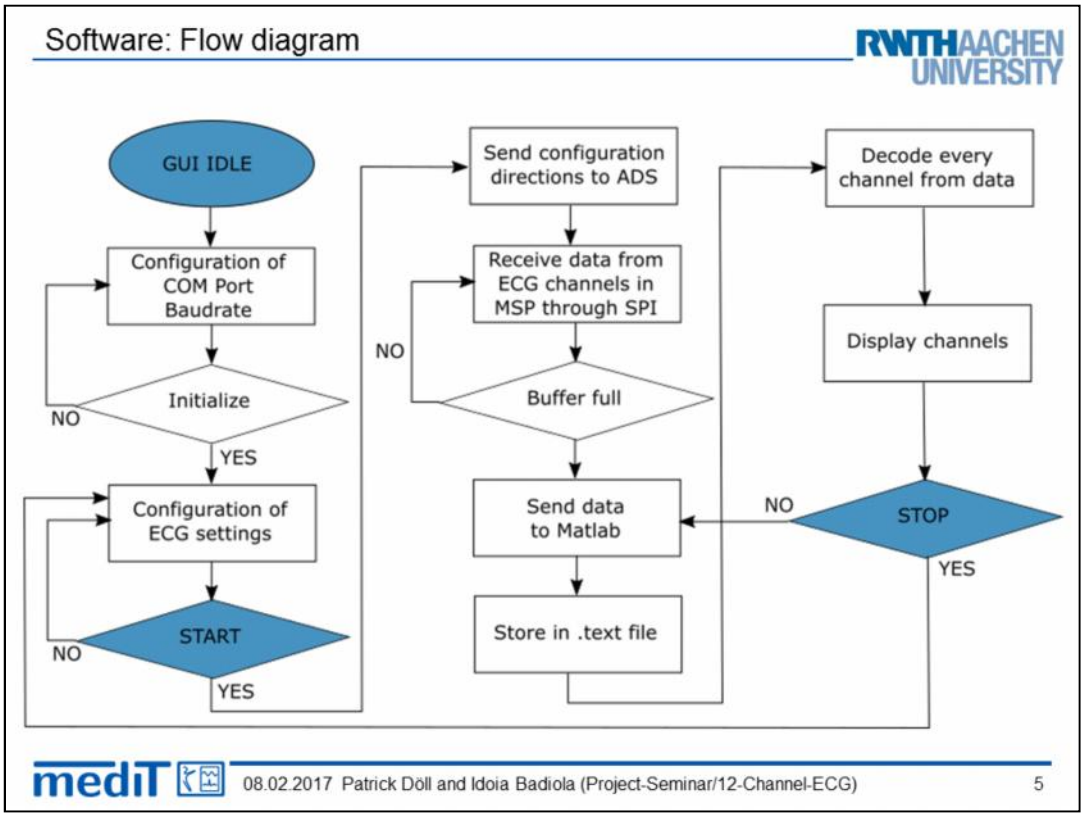
Well, as to the software, there were two main issues at the programming which had to be solved:

Firstly, the microcontroller had to be programmed in C language, so that it could communicate through SPI with the ADS board, from where it gets all the ECG data. And, of course, the microcontroller had also have to communicate with the computer through USB.

On the other side, the storing of data in the computer had to be programmed in MATLAB.

All three issues, I mean, USB, SPI and the storing of data had to be arranged precisely so that non of the data got lost. For that, we had to pay special attention to the different clock rates of the system, as well the size of the internal buffers.

As we have already mentioned, we've included an interactive extra feature, which is a GUI in MATLAB. Later we'll do a little demonstration and you'll be able to see it. But the main characteristics of this interface would be the real-time display of data and the possibility to change the settings of the measurements, such as the baudrate, the measurement mode, or any other register from the ADS board



This is the flow diagram of our program. As you can see it begins and starts with the GUI we have created, so that the user has the total control on the measurement and storing of ECG signals.

Explanation of GUI

Configuration

- COM Port- Baudrate
- Measurement mode: Test signal
- Input electrode:10Hz Channel 4

Display of different channels

Output command window

12-Channel-ECG

Patrick Döll and Idoia Badiola
Seminar/Project

Supervisor: Dipl.-Eng. Lennart Leicht

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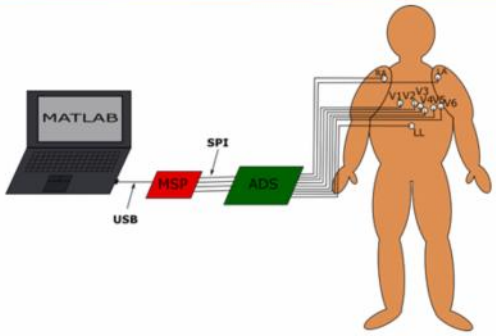
Thank you
for your attention!



So that was our presentation.
We hope you enjoyed it or, at least, you found it interesting
Thank you for your attention