

# Blood Pressure Tester

Initial Project and Group Identification

EEL 4914 Senior Design I  
Fall 2011



Group 5

Members: Brandon Sbert, Ricardo Wheeler, Bianca Belmont, A. Raj Bose

Sponsors: Texas Instruments, Workforce Florida

Mentor: Herb Gingold

Technical Area: Biotechnology

## **Project Description**

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### ***Motivation***

Our motivation is to design a Blood Pressure Tester. This project emerged from the opportunity to be sponsored and mentored professionally by Texas Instruments.

### ***Goals and Objectives***

The goal of this project is to implement the WSAFE chip to build a blood pressure monitor. By achieving this objective, the doctor will be able to have an easy access to the patient's blood pressure data, even if he is not physically located in the same room as the patient.

### ***Function***

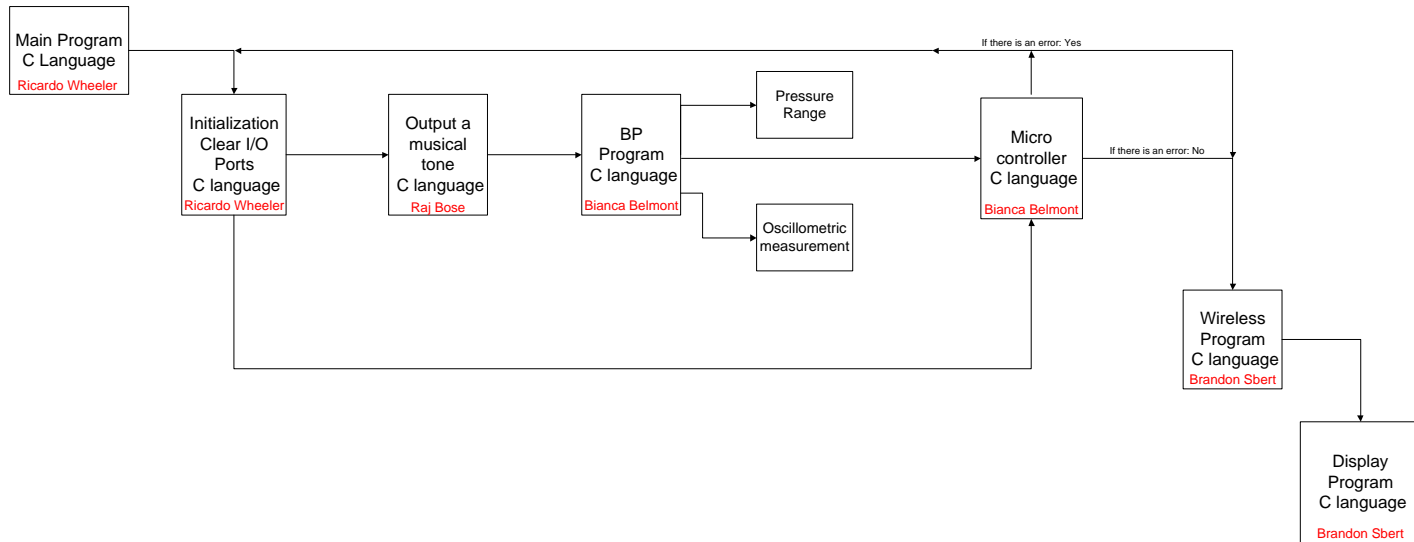
First, the automated blood pressure machine will gather blood pressure data from the patient, then the data will be sent to the pressure sensor chip (which is on the PCB board), from there the information is sent to the microcontroller (which is on the PCB board). This Data will be then sent to a display (which is a part of the MSP430 4x Experimental Board), this data will either be sent wirelessly by a wireless component on the PCB board or it will be directly connected to the experimental board to send the data. The data will also be displayed in another location, wirelessly from the experimental board to another display (most likely a PC), where a medical professional can monitor and analyze the data.

### *Specifications and Requirements*

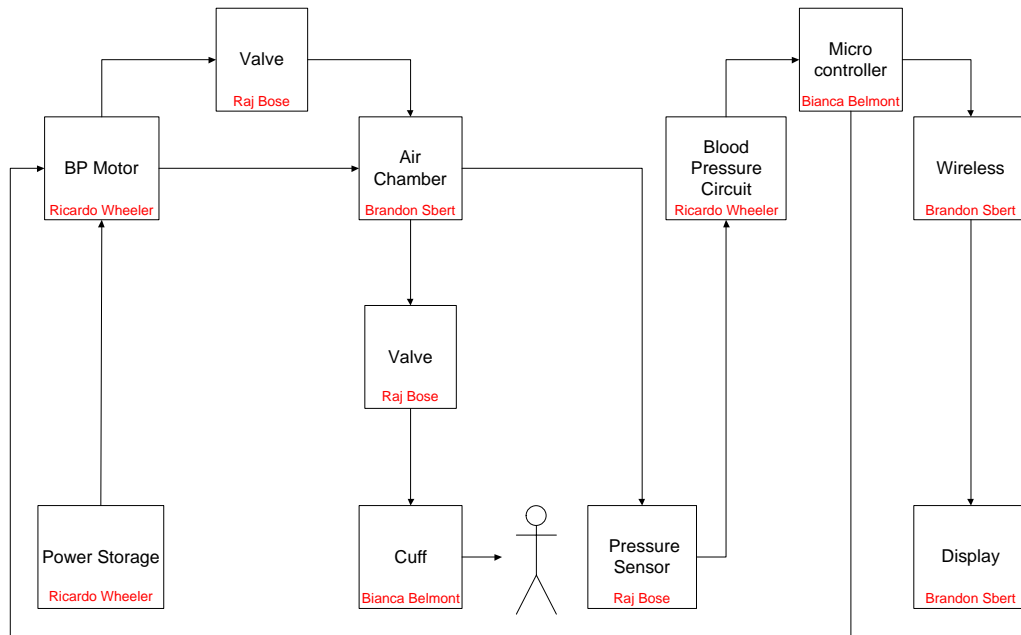
<b><u>Power:</u></b>	Runs on 3-9 Volts
<b><u>Power Life:</u></b>	Able to run for 2 months with 1 daily measurement
<b><u>Pressurization:</u></b>	Automatic, using micropump.
<b><u>Deflation:</u></b>	Active exhaust valve.
<b><u>Type:</u></b>	Oscillometric
<b><u>Accuracy:</u></b>	Pressure: plus or minus 3mmHg or plus or minus 2%
<b><u>Pressure Range:</u></b>	20mmHg to 280 mmHg
<b><u>Wireless Range:</u></b>	Greater than or equal to 10m
<b><u>Display:</u></b>	Digital 10-mm character height, 4 lines, 30 characters
<b><u>BP Cuff:</u></b>	Adjustable for most sizes

# Project Block Diagrams

## Software Block Diagram



## Hardware Block Diagram



***Project budget and financing***

All parts and equipment financing are courtesy of Texas Instruments and Workforce Central Florida.

Component	Quantity	Price	Total (Tax+Shipping)
Batteries	8	10	20
BP Motor	2	5	10
BP Pump	3	10	30
BP Valve	3	3	9
BP Cuff	2	20	40
Microcontroller	3	1	3
Op-Amp	5	2	10
Resistors	10	0.7	7
Capacitors	10	1	10
Experimental Board/Display	1	200	200
Pressure Sensor	4	65	65
Wireless Component	2	120	240
PCB Board	1	55	55
<b>Sub Total:</b>	<b>54</b>	<b>492.7</b>	<b>699</b>

## *Milestones*

Fall 2011

- Full project outline
- Pricing and supplier list
- Obtain all parts and devices necessary for design implementation
- Blood pressure device through microcontroller built
- Driver programming complete

Spring 2012

- Panel judges signed confirmations 1.5 months prior to presentation date
- Wireless device setup and programming complete
- Prototype complete
- Multiple test runs complete
- Final project documentation
- Website

### Texas Instruments Summary:

Texas Instruments is known as one of today's leading developers of semiconductor and computer technologies. TI is an American company based out of Dallas Texas; it's the third largest manufacturer of semiconductors worldwide following Intel and Samsung. TI is also the largest producer of digital signal processors and analog semiconductors following a wide range of different types of semiconductor products. TI has been in many different markets including defense electronics, infrared and Radar systems, Missiles and Laser-guided bombs, Military computers, Semiconductors, also the first company to have silicon transistor and integrated circuits, etc. Texas Instrument today is made up two main divisions, Semiconductors and Educational Technology. Given how well rounded TI is, they will be able to provide our senior design group with most if not all of our components and guidance for our project The Blood Pressure Tester.

### Mentor Biography:

Herb Gingold will be mentoring our UCF Senior Design Project the Blood Pressure Monitor. Herb graduated from the University of Central Florida in May of 1991 with a BSEE in Electrical Engineering. He currently holds the position of Major Account Technical Sales Representative (TSR) of Florida for Texas Instruments. He began his career as an engineer at Lockheed Martin from January 1986-January 1993, from there he was an FAE for the company Bell Industries from January 1996-January 1998, then he became the Regional DSP FAE for the company Analog Devices from January 1998-January 2000, he was also the TSM for Future Electronics from October 1998-October 2002. Finally he was a part of the UCF Advisory Board from 2004-2010. Herb has been exposed to a lot of different positions in the engineering world and would be a great mentor for our team.