NeoNur:
A Feeding Device for Premature Neonatal Nursing

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Topics

- Background
- Goals
- Methods
- Conclusions
- Q&A
Background

- Many babies are born prematurely
- Studying feeding could help monitor infant health, growth, and development
- Nurses at the Children’s Hospital of Philadelphia (CHOP) want a device that can monitor feeding outside of the lab
Background

- The current system is not fit for an ICU
- The NeoNur apparatus is:
  - Smaller
  - Portable
  - Not tethered
  - Has fewer parts
  - Requires little or no tools
Goals for Summer 2008

- Finding which parts of the design are functioning improperly
- Determining the sources of error in the hardware and software
- Implementing a simple solution to fix the problems
Circuit Schematic

- Pressure Sensor
- Amplifier
- ADC
- EUSART
- SSP
- PIC Microcontroller
- Flash
- Computer
Methods

- Tested the circuit by sequentially
  - Each test targeted one element, since each new test had only one new element

Tools:
- Testboard and Sockets
- Power Supply
- Digital Multimeter
- Oscilloscope
- MPLAB IDE/ICD2
- MPLAB Header
Testing the Amplifier

INA128 Testing

-4 0.01 1.07 2.06 4.7

Input Value (mV)

0 0.5 1 1.5 2 2.5

INA128 #1
INA128 #2
INA128 #3

-4 -1.3 0.8 1.07 1.16 2.06 3.05 4.7

Input Voltage (mV)

0 0.00002 0.00004 0.00006 0.00008 0.0001 0.00012 0.00014 0.00016 0.00018 0.0002

0.000002 0.000018 0.000016 0.000014 0.000012 0.000011 0.000008 0.000006 0.000004 0.000002 0.000001

INA128 #1
INA128 #2
INA128 #3
Circuit Schematic

- Pressure Sensor
- Amplifier
- ADC
- EUSART
- SSP
- PIC Microcontroller
- Computer
- FLASH
Testing the ADC

- Sent a sinusoid into the ADC port of the microcontroller
Circuit Schematic

Pressure Sensor

Amplifier

Computer

EUSART

SSP

FLASH

PIC Microcontroller
Testing the EUSART

EUSART signal was not received by the microcontroller.
Debugging EUSART with a header

- A header allows the computer to display what is in the microcontroller
- Found that there issues with wiring
- Fixed by soldering extra pins and plugging in EUSART cable
Testing the FLASH

- Initial SSP communication with the FLASH succeeded
- Compatibility of header with FLASH an issue
  - Working on Voltage Converter
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