**Microcontroller Final Selection**

**Atmel AT32UC3A0128**

**Benefits:**

* LQFP package - makes surface mount soldering and hardware debugging easier as opposed to the BGA package
* 128K Bytes of flash memory- enough memory in order to allow programming storage
* Uses existing AVR JTAGICE mkII debugger already in cpre 288 lab
* Already existing software libraries - cut down programming time
* 66MHz max frequency
* 1.8-3.3 operating voltage capable of power with a set of AA batteries
* -40C to 85C - will handle extreme heat conditions from the steam pipe
* USB compatibility-allows for programming and connection to and from any PC
* Ethernet MAC 10/100 - fits our networking needs
* 4 USART - fits our needs for wireless communication and networking
* 2 SPI - fits our need for LCD graphic control
* 1 ADC - fits our need for the temperature sensor application
* 16-bit Stereo Audio Bit stream - allows for integration of a speaker unit
* On-Chip Debug System (JTAG interface) - allows for easy debugging
* 144-pin LQFP (109 GPIO pins) - fits our needs for push buttons and other peripherals that we might want to add

Overall, the extra features add great flexibility to our design. They allow us to change features quickly and expand on areas of the project.

The main reason for choosing this particular microcontroller is because our whole group has experience with ATMEL processors. There also exists a software library that we will use and save weeks of programming. It is the most basic ATMEL unit with integrated Ethernet module and costs roughly 8.55 to 10.18 per unit or 8.21 for 10 units.

**Cost considerations:**

http://www.supplier-direct.com/silabs/Cart.aspx?supplierUVID=63410000&partnumber=CP2201-GM&quantity=1&issample=0

http://search.digikey.com/scripts/DkSearch/dksus.dll?Detail&name=ATMEGA165A-AU-ND

http://www.mouser.com/Search/Refine.aspx?Keyword=AT32UC3A0128

50 units for separate Ethernet and Atmel units: 535.22 - bare minimum

50 units for embedded Ethernet controller: 700

164.78 dollar difference!

3.30 dollars more per controller!

* 3.30 dollars buys flexibility in terms of design and greatly adds to product capabilities.
* Buys convenience in terms of programming and debugging – saves weeks’ worth of time.
* Buys a embedded Ethernet module without ambiguity in terms of microcontroller and Ethernet driver compatibility.

<http://store.atmel.com/SearchResult.aspx?q=gsd:m-11637>