Hardware

The hardware for our system consists of three main pieces. First, we have a main board that does all of the digital signal processing (DSP). Second, we have a daughter board that connects to the main board via headers. The daughter board will contain the camera interface and a direct memory access controller (DMA controller). The final main piece of hardware is the board that connects to the computer. This third board will communicate with the main board by wireless.



The Main Board

The main board consists of the Beagle Bone development board. This board utilizes the ARM Cortex A8 which features a clock speed of 500-750 MHz and an optimized floating point unit on chip. These features make it ideal for our DSP. This board will communicate with the computer interface board using wireless at 2.4 GHz provided by the XBEE from Sparkfun.

The Daughter Board

This board will be a custom board designed by the team. It will consist of all circuitry that is required to interface to the camera. The interface between the camera and the main board will be DMA. Choosing to do DMA will allow us to use specialized hardware to handle the memory access, and keep the main board from using clock cycles on low lever processing. The board will feature a Steallaris ARM Cortex M3 which may be used as a preprocessor for the images.

Computer Interface Board

The computer interface board is fairly simple. It will have a MSP430 that will accept data from the main board using a paired XBEE. It will then send commands over USB to the computer. These commands will be received by custom software running on the host computer that will move the cursor accordingly.