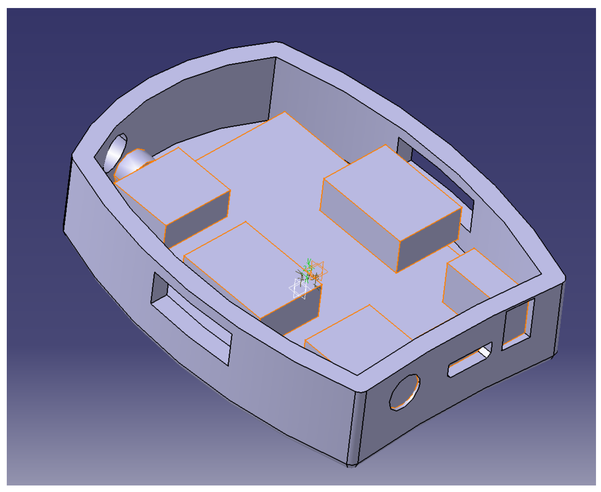
Electrical Engineering and Computer Science
EECS373 - Design of Microprocessor-Based Systems

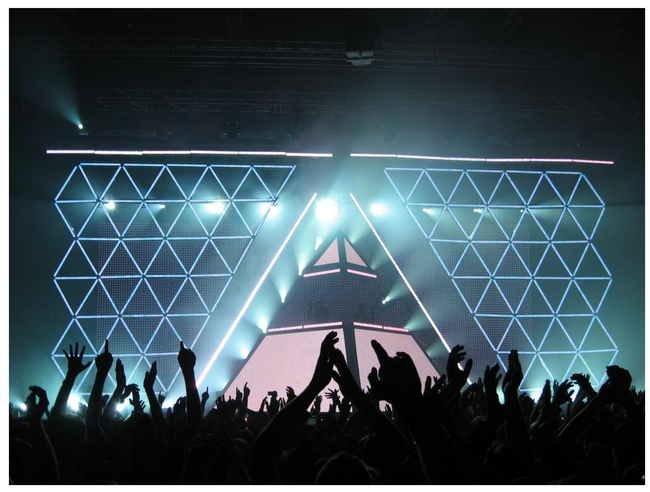
BlackBox

Jonathan Bendes and Jason Shintani
jbendes@umich.edu, jashinta@umich.edu

Introduction



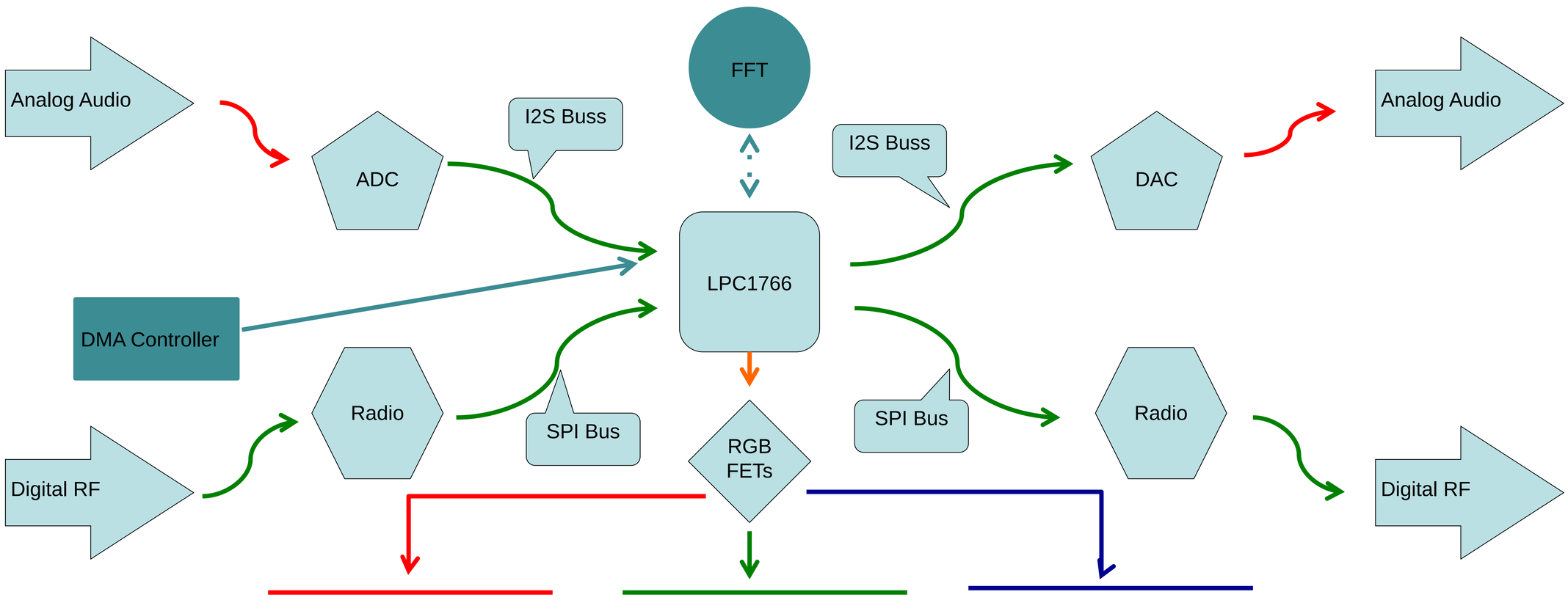
Why only listen to music, when you can be a part of it. BlackBox is a simple multi-purposed device that lets you see, hear, and feel your music in ways never before accessible to the mainstream population.



Problem Description: design an wireless music visualization module

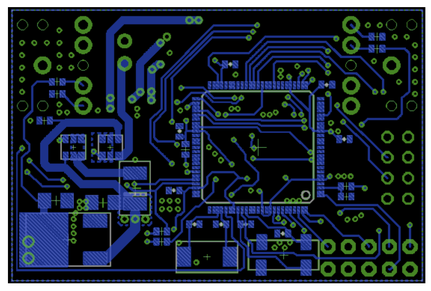
- Design our own custom printed circuit board (PCB)
- Interface with an high-precision audio codec, using the I2C and I2S busses.
- Use the direct memory controller (DMA) to move ADC and DAC data.
- Perform an FFT to drive visualization logic
- Drive LEDs with a MOSFET power circuit
- Operate from 12Vdc jack, USB or a 3.7Vdc battery

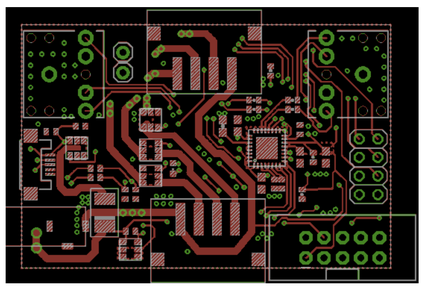
The Process:

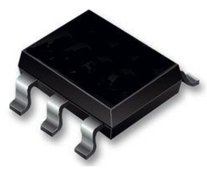


Communication & Components

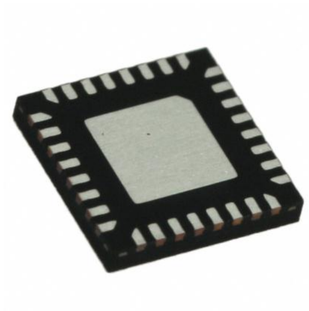
- 24-bit ADC/DAC audio codec
- 3 PWM MOSFETS
- USB programming







- Custom PSB
- Wireless communication with RF module
- 32-bit 100MHz ARM Cortex-M3



Conclusion

In an world driven by the latest technology, BlackBox appeals to both the plug-and-play audience and the hobbyist. Planned to be an open-source platform, BlackBox has many capabilities not limited to music visualization.