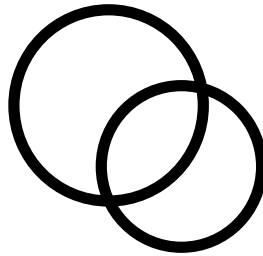
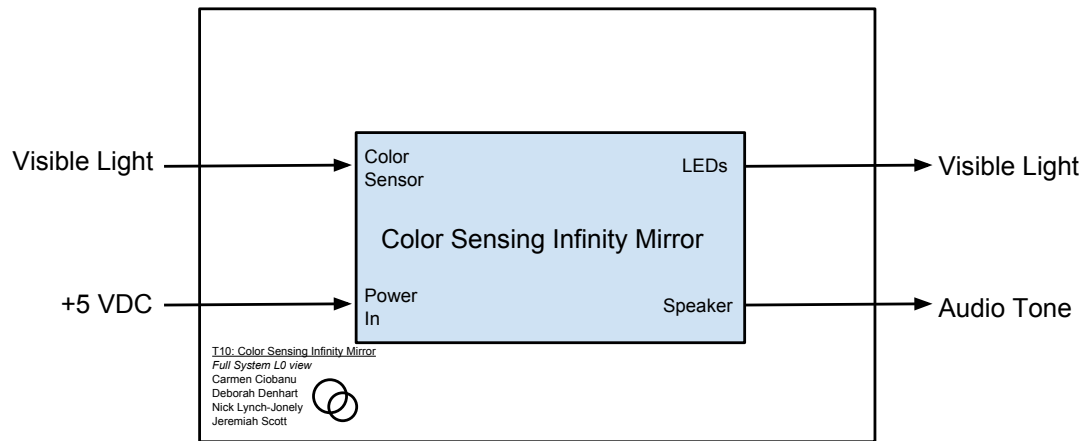


T10: Color Sensing Infinity Mirror

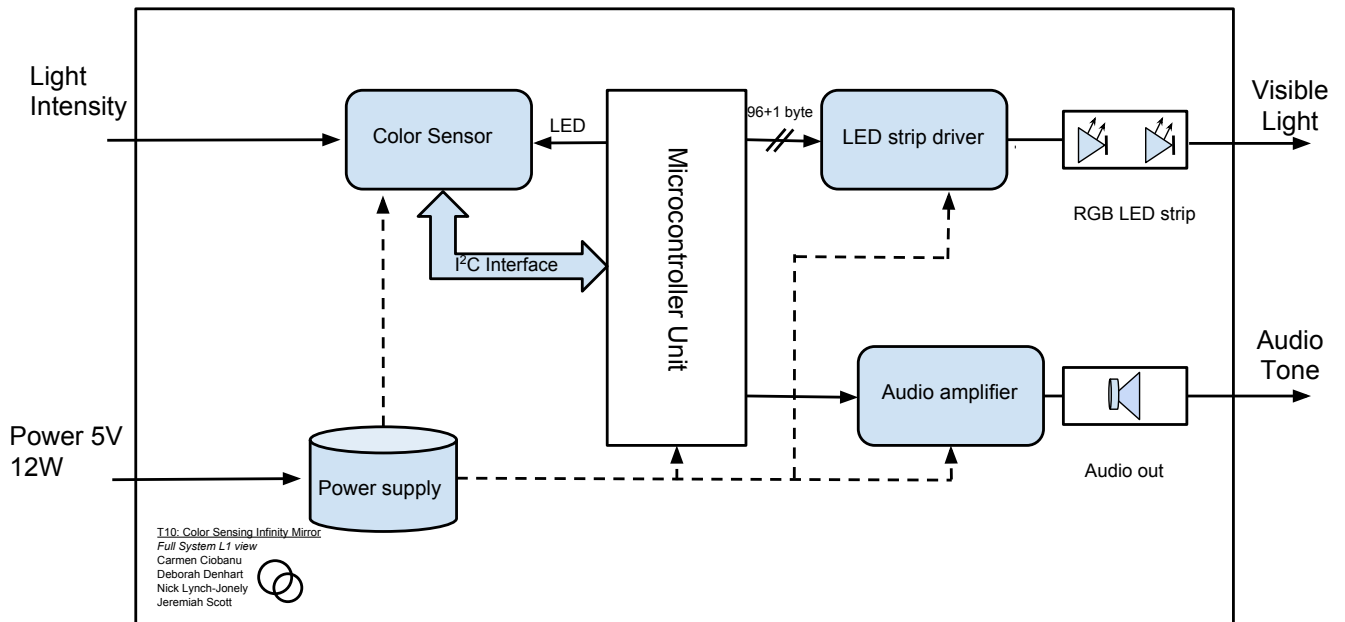
*System Level Design: Functional Decomposition and UML Behavior Modeling*

Carmen Ciobanu  
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Nick Lynch-Jonely  
Jeremiah Scott



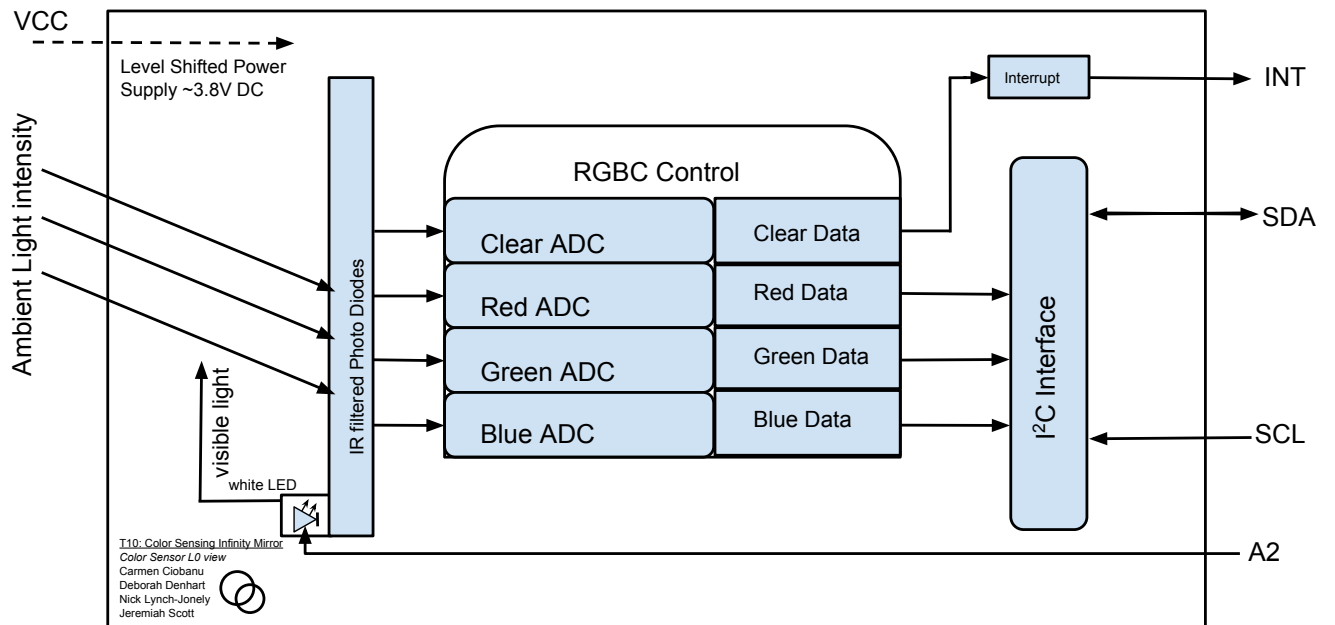


Module:	T10: Color Sensing Infinity Mirror ( <i>Level-0 system view</i> )
Inputs:	Visible light of wavelength 300 to 1100nm, +5 VDC power supply.
Outputs:	Corresponding RGB light and audio tone sequence.
Functionality:	System outputs RGB light and audio tone sequence corresponding to visible light input.

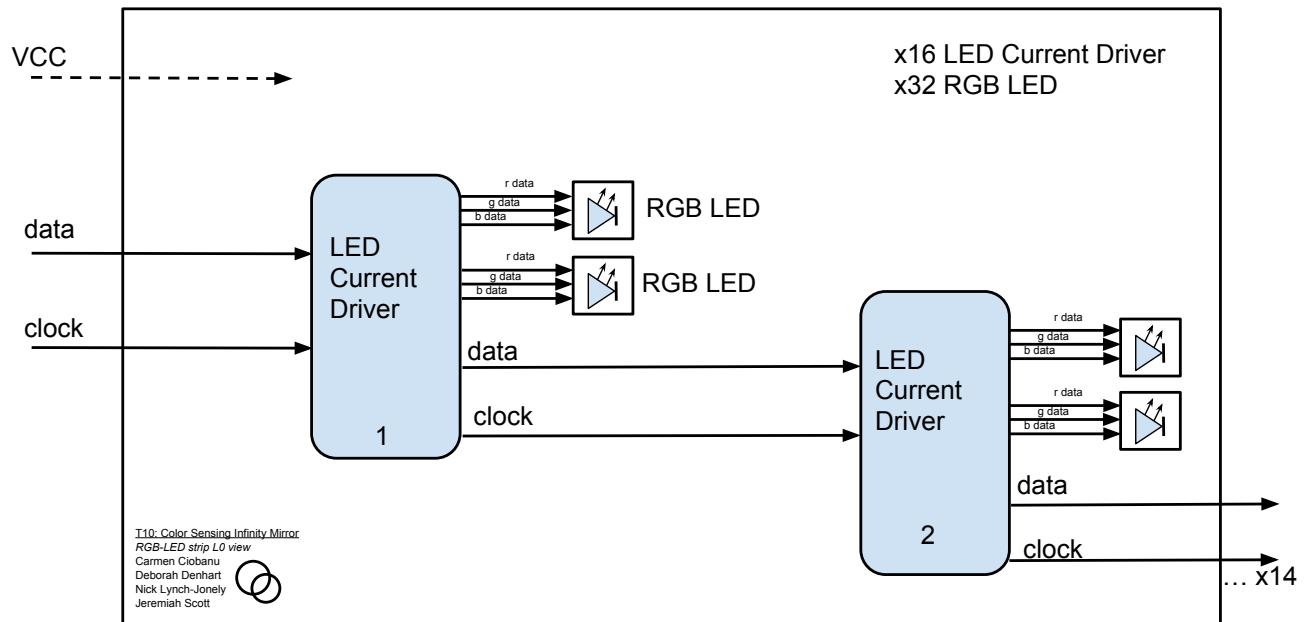


T10: Color Sensing Infinity Mirror ( Level-1 system view )

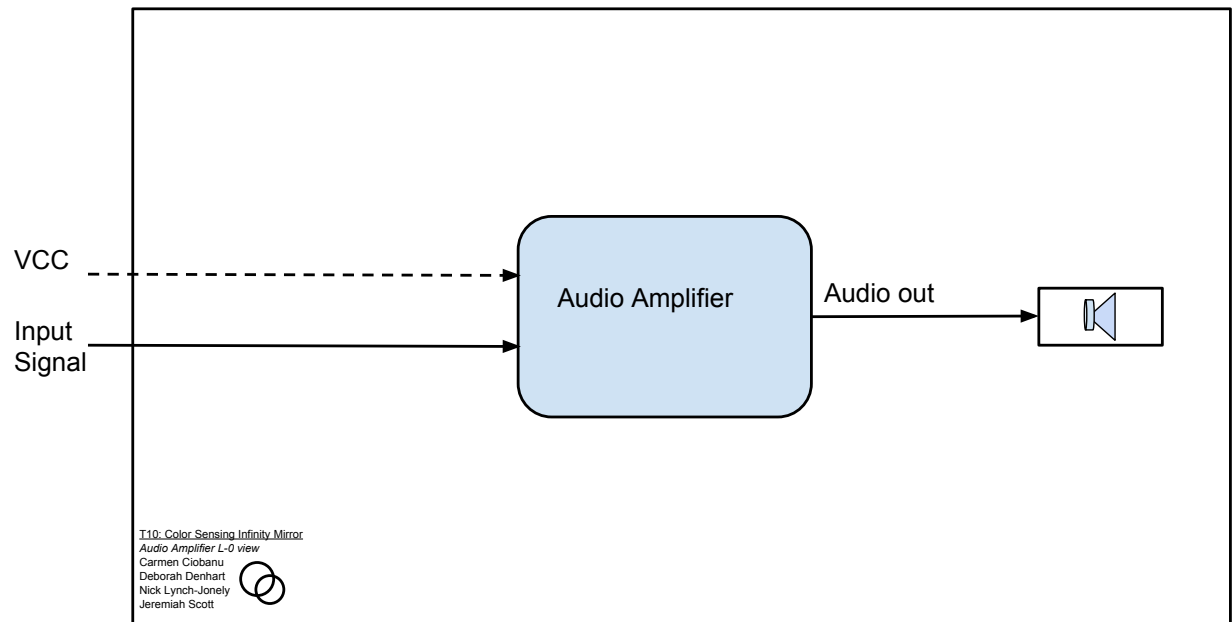
<b>Brief Description</b>	System responds to color of ambient light input by generating a corresponding color LED output and selects a single audio tone from a bank of six corresponding audio sequences that are assigned a range of color.
<b>Inputs</b>	Light intensity reading: $\lambda = 300 - 1100\text{nm}$ Power: 5VDC 12W
<b>Outputs</b>	LED emission: RGB color corresponding to light intensity input Audio output: Tone sequence corresponding to light intensity input



Module:	T10: Color Sensor ( Level-0 module view )
Inputs:	Analog signal corresponding to detected light wavelengths of 300-1100nm, line A2 connected to white LED to assist with capturing light wavelength data. -0.5 to +3.8 VDC power supply.
Outputs:	Analog-to-digital conversion of IR filtered photodiode signal is transferred to double buffered data registers and sent to a two wire I <sup>2</sup> C serial bus directly connected to microcontroller unit, ~400kHz transmission rate.
Functionality:	16-bit digital signal containing 4-bit representations of RGB levels plus a 4-bit clear register sent to an I <sup>2</sup> C interface



Module:	T10: RGB LED Strip ( <i>Level-0 module view</i> )
Inputs:	+5 VDC power supply (Vcc), 96+1 byte serial data, clock
Outputs:	x6 1-byte PWM channels driving x2 RGB LEDs in light range from 475 to 630nm wavelength, serial data, 1Hz clock signal
Functionality:	Drives RGB LED color from +/- 0.4V PWM signal input. Each driver chip is responsible for 2 LEDs. 96+1 bytes of information are sent to the first driver chip, 6 bytes are used for that chip and 90+1 bytes are passed on. Process continues for remaining driver chips.



Module:	T10: Audio Amplifier ( <i>Level-0 module view</i> )
Inputs:	+/- 0.5V PWM signal, +5 VDC power supply (Vcc)
Outputs:	One of 6 possible audio tones corresponding to the color of the ambient light detected by the system.
Functionality:	Amplify digitally-generated sinusoid signal from microcontroller into audio tone. Amplification is static and no volume control is available.

