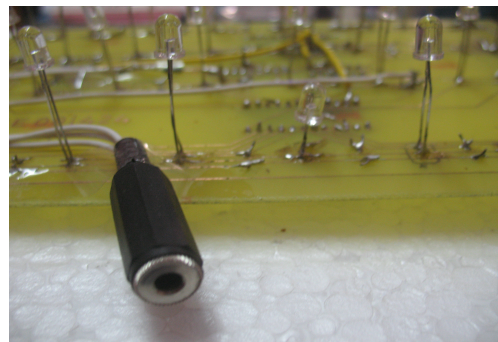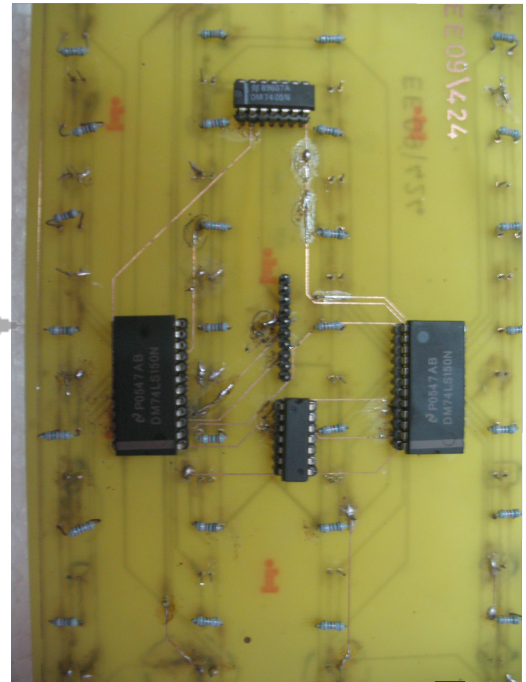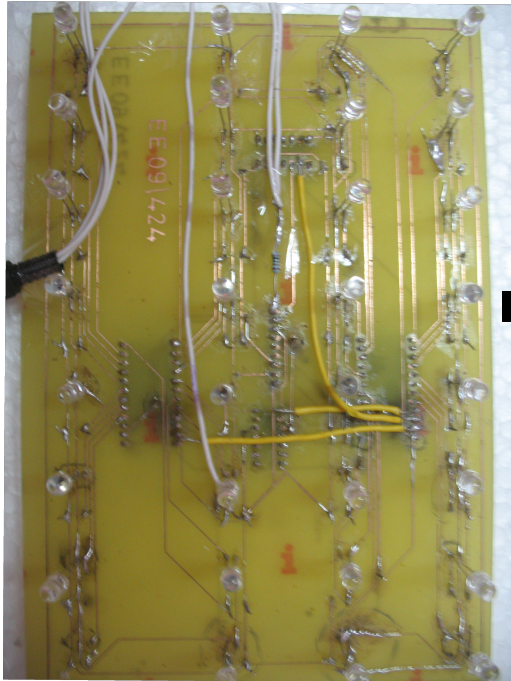# COOL MUSIC BOX

-Nancy Aggarwal, Swarna Ramenini, Radhika Gupta
2 December 2009

CIRCUIT BOARD

AUDIO OUTPUT

SELECT
PINS

ATMEGA 168
ARDUINO

SENSOR OUTPUT

HARDWARE

The hardware was composed of :
1. **A wooden box with two copartments :** the above one containing the IR source(60 Watt tungsten filament bulb) and the bottom containing the circuit board.
2. **The circuit board :** The sensors, miltiplexer, resistors, speaker were mounted on the board.
3. **Components Used :** IR sensors(PT 333) , 10 KOhm resistors, multiplexer(74LS150), ICs – 74LS04P(NOT), 7400N(NAND), ear phones, female jack (to fix speakers)
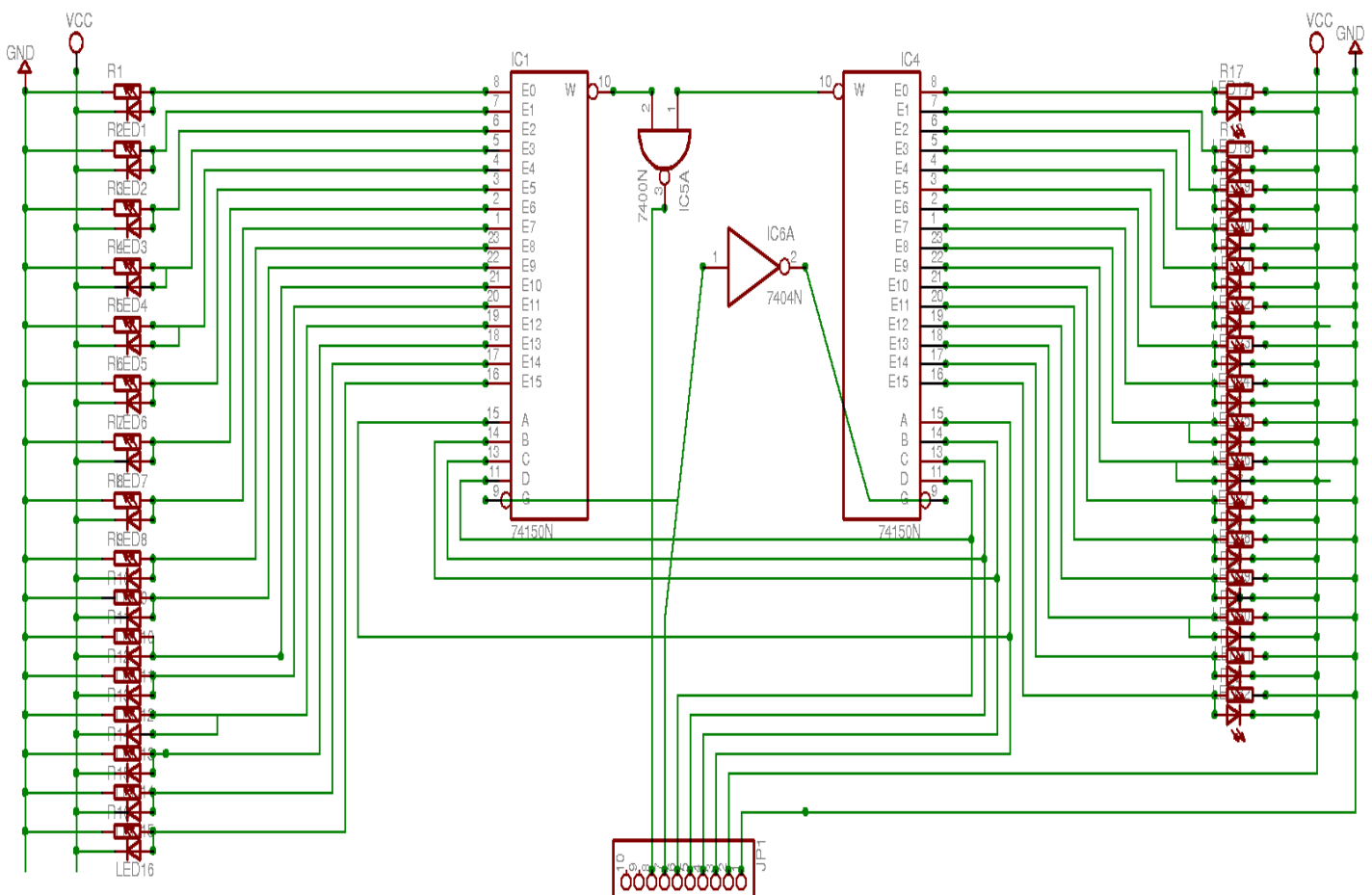
INPUT

The system has a digital input which tells which sensor is on/off.
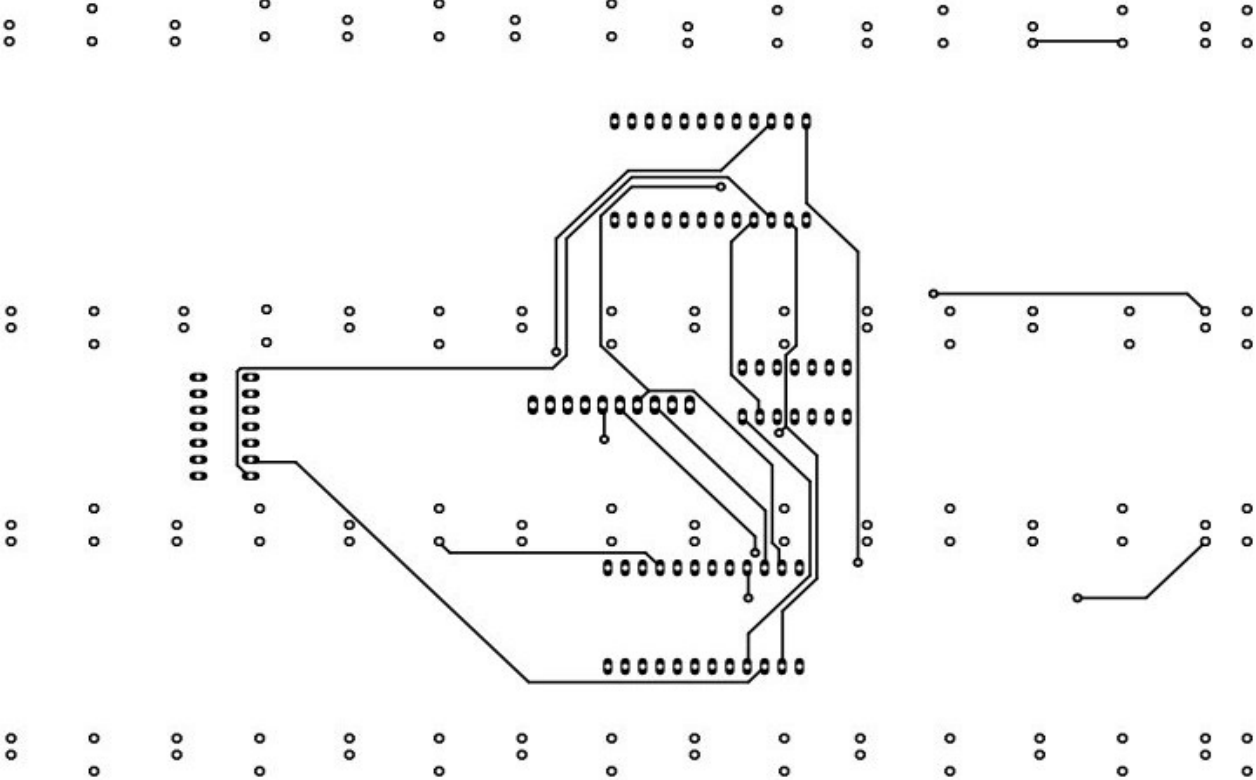
OUTPUT

The output is via speakers and is the sound generated from the play function explained below.
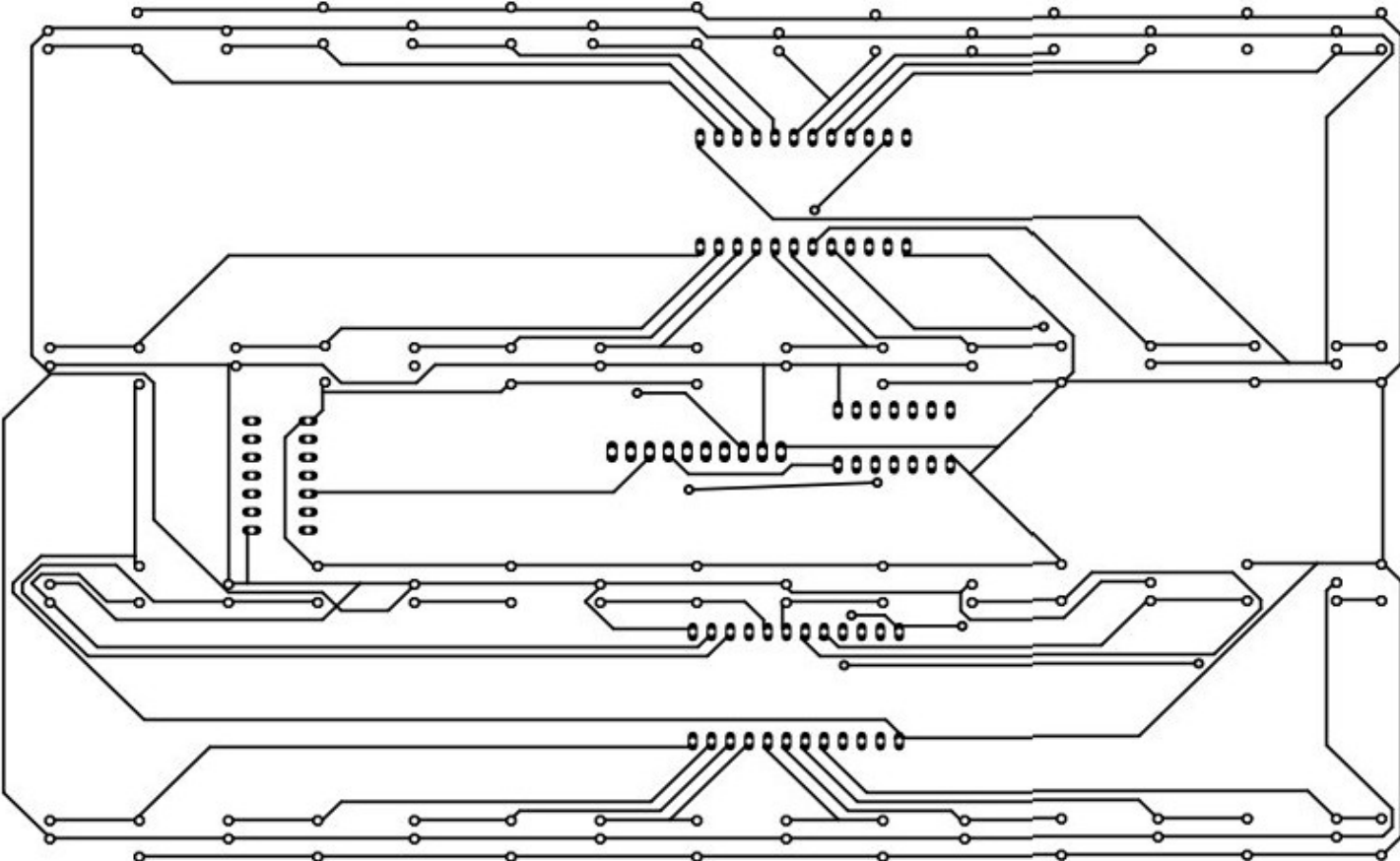
CIRCUIT SCHEMATIC :

CIRCUIT LAYOUT

TOP

BOTTOM

SOFTWARE (Algorithm)

The algorithm consisted of basically two parts:

1. **Giving select lines to the multiplexer:**
Starting from 00000(since we have 32 sensors and thus 5 select lines to the mux) we add 00001 to the LSB in each turn of a 'for' loop running 32 times. Thus each instance of the loop gives a command to select a paricular sensor output.

2. **The play function** :
This function is invoked when a sensor is detected as off (light blocked). It has predefined frequency for the first note and then calculated other notes using a mathematical formula. It takes as input the no of note to be generated. Then the output pin connected to the speaker is toggeled as HIGH and LOW at the calculated frequency.

WORK DISTRIBUTION :

1. Hardware:
        Music Box
                Wood work - Nancy, Swarna, Radhika
                Final Assembling – Radhika, Swarna
        Circuit testing and conceptualizing– Radhika, Nancy,
                Swarna
        Eagle Work- Nancy, Swarna
                (with help from Mishel & Ankita)
        PCB printing- Nancy
        Circuit soldering/debugging – Nancy, Swarna,
                Radhika
2. Software
        Play function- Nancy
        Select Lines function and sensor reading – Radhika

FINAL OUTCOME

Due to non functioning of the circuit board we finally made the circuit on bread board using 10 sensors and generated music using these.

THINGS TO NOTE :
1. The IR sensor diode behaves differently in reverse and forward bias, the value of resistances used in the two cases is different.

2. When soldering the diodes, it should be kept in mind that they may get damaged by close contact/ prolonged exposure to the soldron.

3. Use of printed PCB should be avoided.