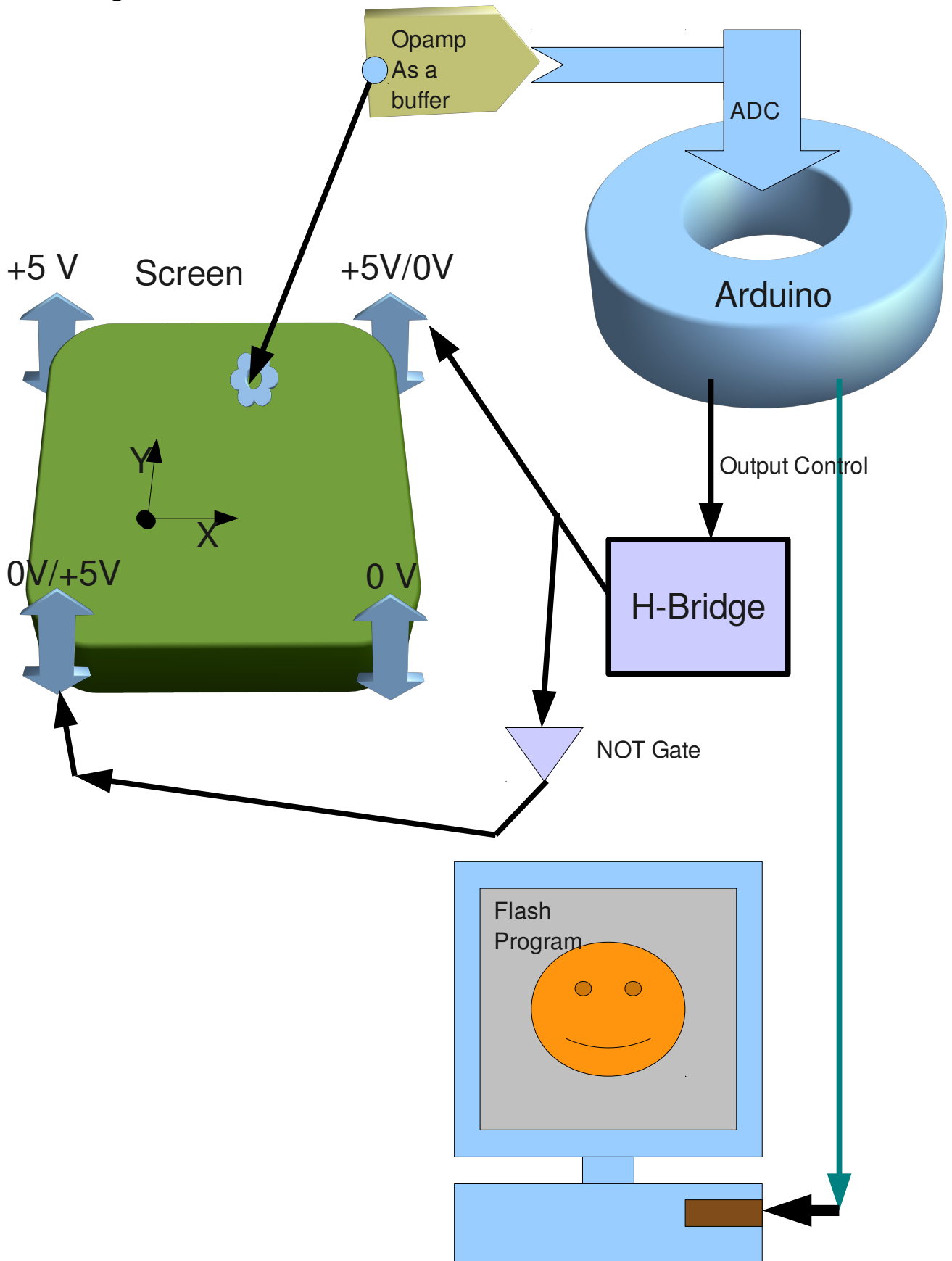


TouchScreen/Digital Pen

-Pranjal Bordia, Saket Patkar, Rishi Swami

We plan to make a touch-screen whereby when one draws on the screen it comes drawn on the custom written software on the computer. Serial Port communication is used and arduino serves as a data sampler, as well as an interface between the computer and the screen.

Block Diagram:



Input :

We took an anti-static sheet as our pad for screen. Though its response is not good, it is satisfactory to demo the our idea of a Resistive Touchscreen.

When one touches the sceet with a probe, then the votage is measured, in both X and Y direction by time sharing of the Voltages (0V/5V).

i.e. When a X value is sampled (with the algorithm in the Arduino Code; basically when is sufficiently stable) then the voltages are switched and the Y value is measured.

Typical time to do is about few 100 milliseconds.

Output :

The value then is sent to the Computer via Serial Port Communication and read by the custon flash program which reads and draws it, which can be seen on the screen.

Work Distribution :

Flash Program on the Computer : Written by Saket.

Arduino Code : Written by Pranjal, Saket

Caliberation : Rishi, Pranjal

Circuit of L293 : Saket, Pranjal

Circuit of NOT gate : Rishi

Op-Amp Circuit : Pranjal and Saket

Screen Circuit : Rishi, Saket

Screen making : Pranjal Saket and Rishi

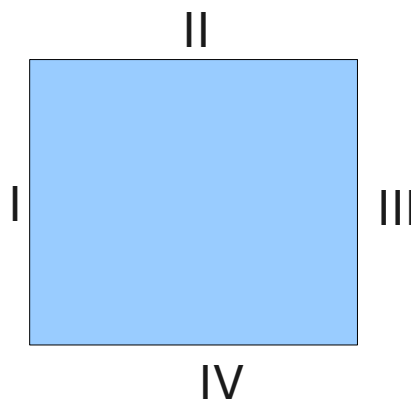
Debugging and Testing the Circuit : Pranjal, Saket and Rishi

Other Works which did not come as a part of Final Project : Rishi got hardware parts from YP.

Pranjal, Saket got sheet from Mahim. Pranjal and Saket soldered a Voltage distributor.

Basic principle for Voltage Generation:

1. When we apply 0V and 5V across a potentiometer wire, we get a linear gradient. Measureing voltage at any point will give us the distance of the point from either side.
2. So, we try to impose boundry conditions on the sheet to get a linear voltage gradient.



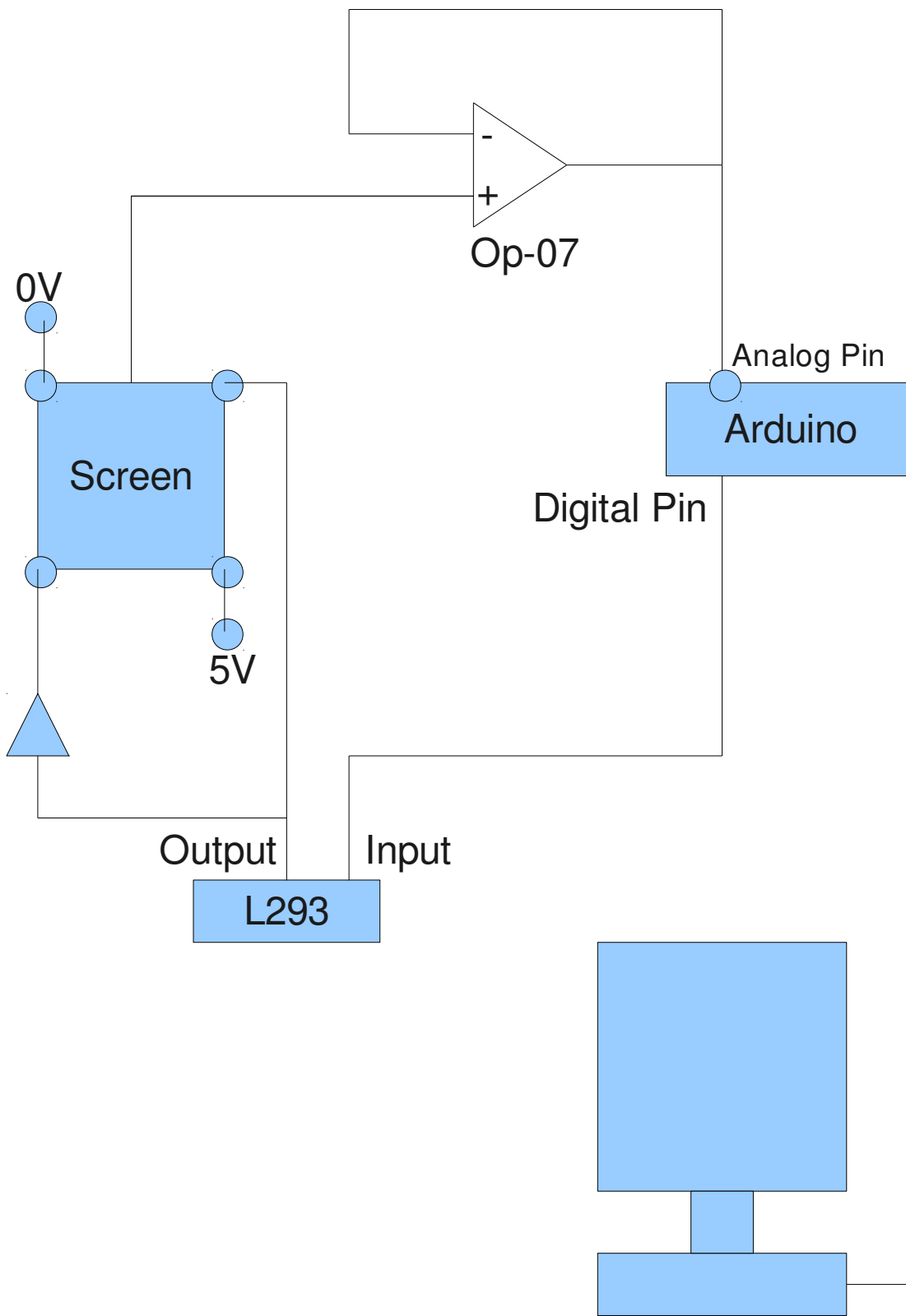
3. Apply 0V on whole of side I.
4. Apply 5V on whole of side III.
5. Apply a gradient of 0V – 5V on sides II and IV.
6. In this way we set up a linear gradient, and voltage at a point will give its distance from both side I and III.
7. Then we switch the Voltage to get the distance in the other direction.

Algorithm in Arduino:

The algorithm of arduino, other than sampling, was more to do with the corrections involved with the anti-static sheet that we had to work with. In nutshell is goes like this:

1. First take a voltage reading in the X-direction. Then, take more readings and make sure we have at least 10 readings in 10% range of the first one.
2. Once, we have a set of these ten readings, average them, and take that as the X-coordinate.
3. Now swap the voltages of the two edges.
4. Then, do a similar procedure of the Y co-ordinate. (10 data in 10% range)
5. Once this data point (X,Y) is obtained, send it to serial port.
6. Repeat the procedure.

Circuit :



Tests :

The resistance of the sheet is very high (~ 1MegaOhm) and hence Op07 Opamp was used (input impedance of ~ 30 MegaOhm) as a buffer. The ADC of arduino then measures the output of buffer. The code of arduino samples properly and tries to reduce erroneous data. Whenever the data value and the consecutive values are not within 10% range, it does not sample it/send it to the computer.

Component List :

H-Bridge –	L293	- 80 Rs
Sheet –	Anti-static sheet	- 150 rs
Opamp –	Op 07	- Taken From Lab
Arduino -	Atmega 168.	- Taken From Lab
Not Gate-		- Taken From Lab