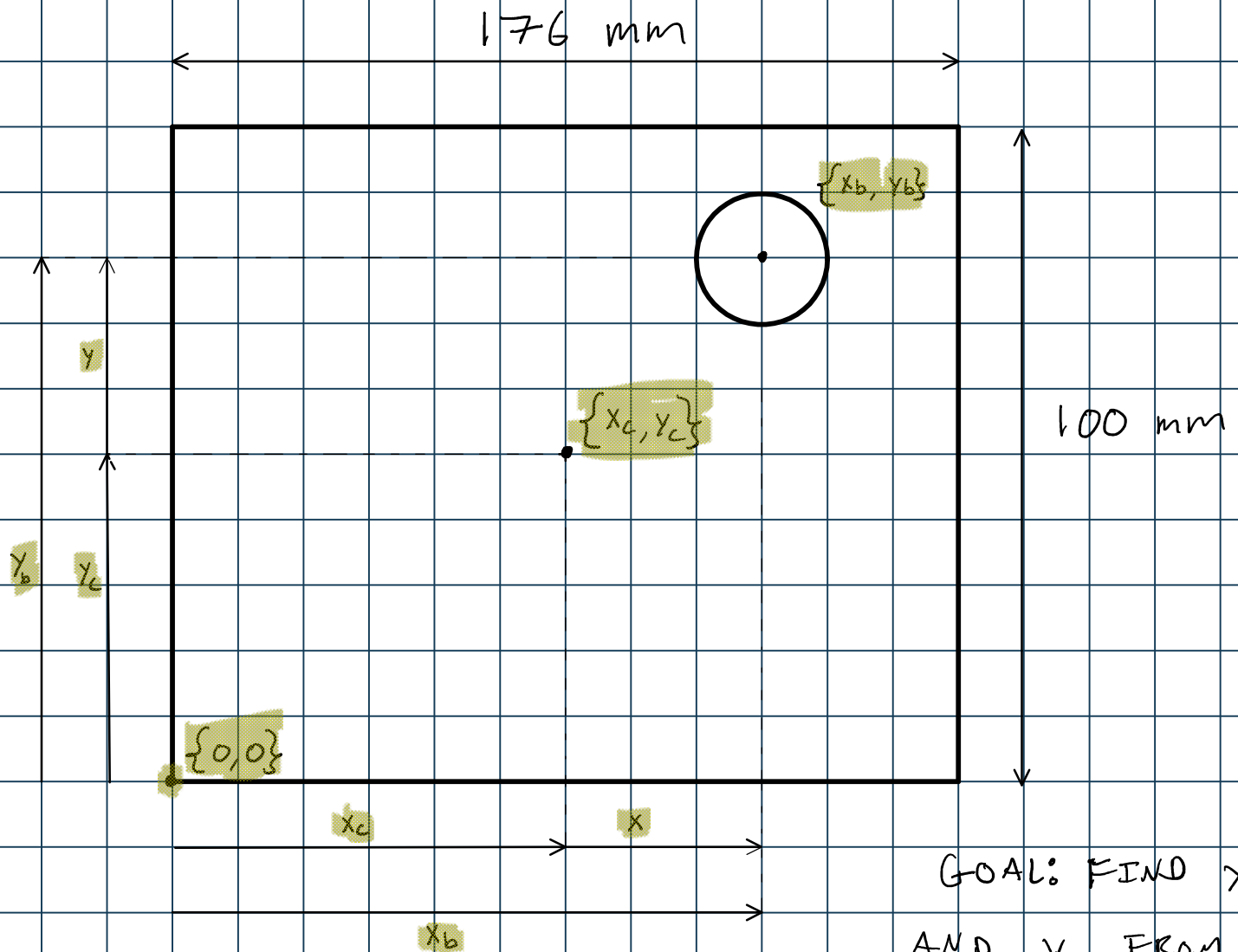


Lecture 21 - 4-Wire Resistive Touch Panels

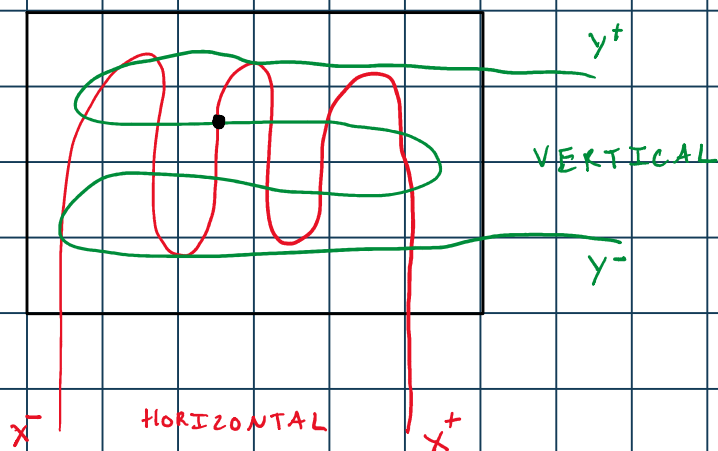
Wednesday, November 10, 2021

9:00 AM



GOAL: FIND x
AND y FROM
ADC READINGS

<https://www.buydisplay.com/8-inch-4-wire-resistive-touch-screen-panel>



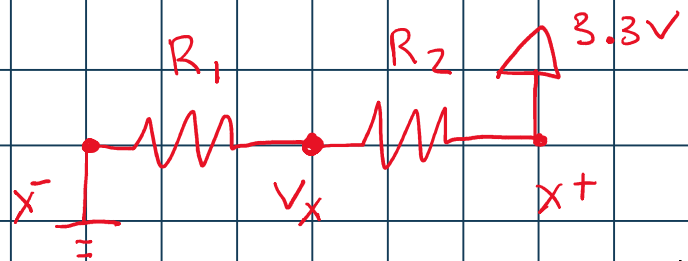
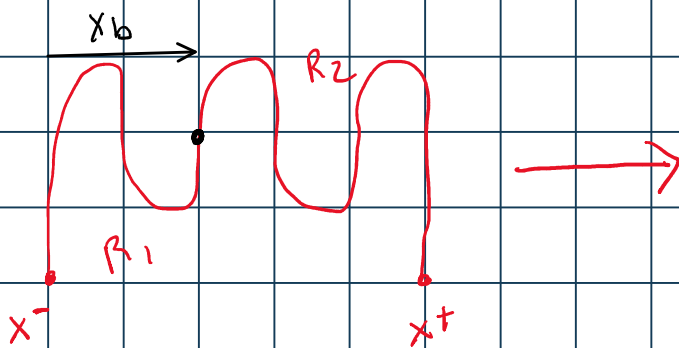
Equivalent Circuit

Wednesday, November 10, 2021

9:00 AM

ASSUME: • RESISTANCE IS UNIFORM
• THE WIRES CONNECTING TO ELEMENTS HAVE NEGLIGIBLE RESISTANCE.

X EQ. CIRCUIT:



PROPORTIONAL TO X_b

$$V_x = \frac{R_1}{R_1 + R_2} (3.3V)$$

CONSTANT

RELATED TO ADC VALUE

$$\frac{V_x}{3.3V} = \frac{R_1}{R_1 + R_2}$$

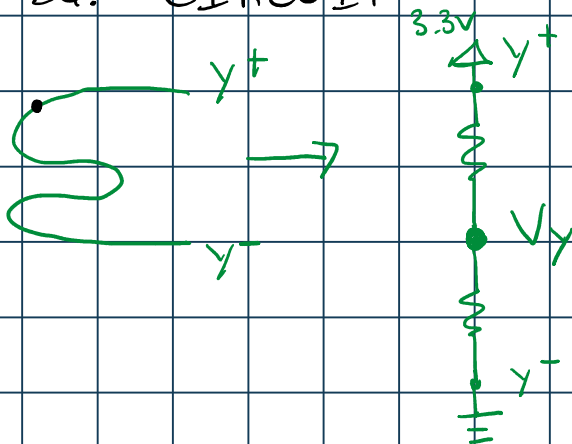
PROP TO X_b
PROP TO WIDTH OF PANEL

$$\frac{ADC_x}{4095} = \frac{X_b}{176mm}$$

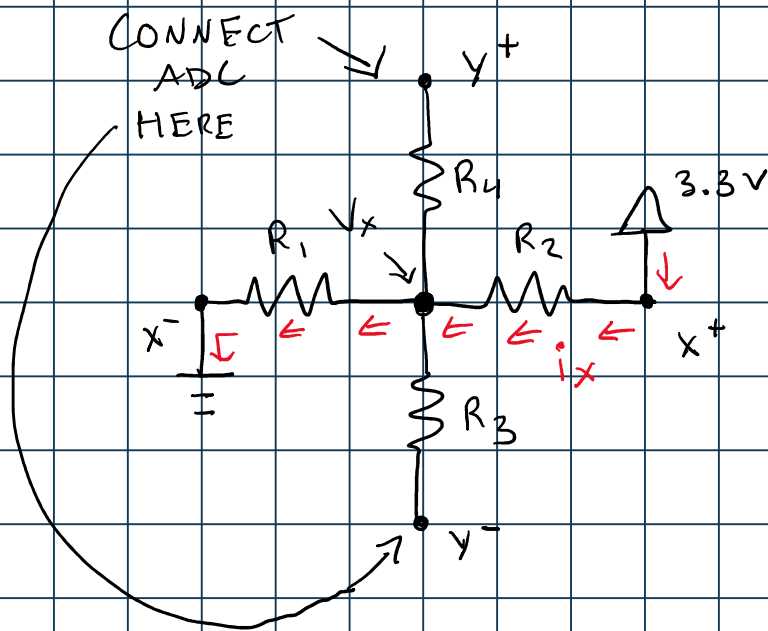
$$X_b = ADC_x \cdot \frac{176mm}{4095}$$

$$X = ADC_x \cdot \frac{176mm}{4095} - 88mm \quad \text{EQ.1}$$

Y EQ. CIRCUIT



$$Y = ADC_y \cdot \frac{100mm}{4095} - 50mm \quad \text{EQ2}$$

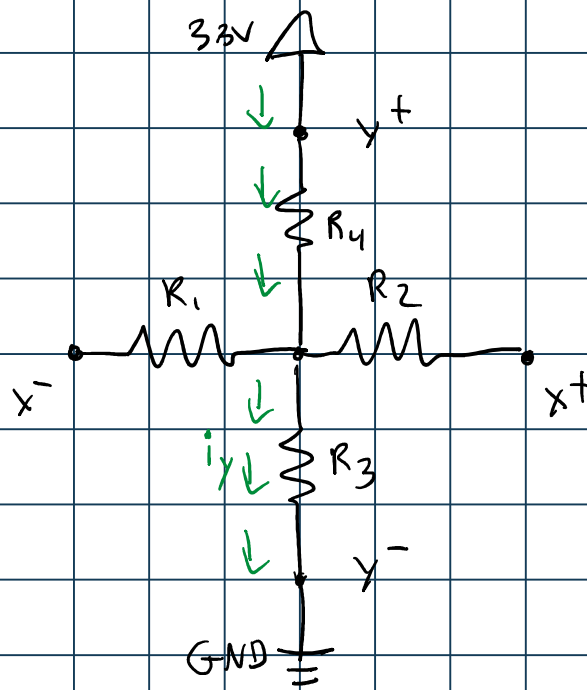


NOTE:

- CURRENT, i_x , FLOWS THROUGH R_1 AND R_2
- NO CURRENT FLOWS THROUGH R_3 OR R_4
 $V_{R3} = V_{R4} = 0V$
- WITH NO DROP ACROSS R_3 AND R_4 WE CAN CONCLUDE $V_x = V_{y-} = V_{y+}$

STEPS:

- a) GROUND x^- (SET AN OUTPUT PIN TO LOW)
- b) POWER x^+ (SET AN OUTPUT PIN TO HIGH)
- c) FLOAT y^- AND y^+ (SET PINS AS INPUTS)
- d) MEASURE V_{y-} OR V_{y+} (USE A pyb.ADC OBJECT)
- e) APPLY EQ. 1 TO ADC READING TO GET x IN mm.

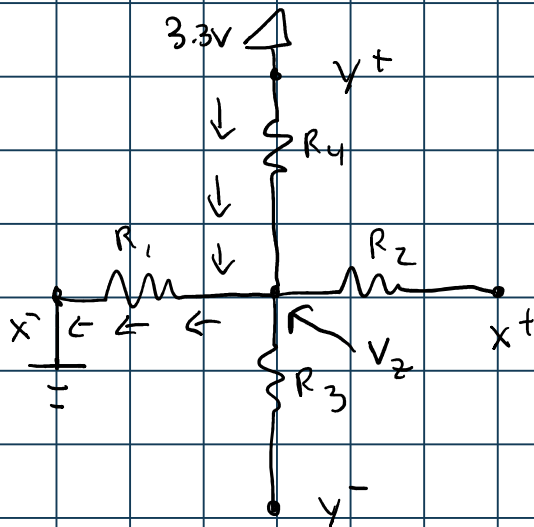


STEPS :

- GROUND y^- (SET PIN LOW)
- POWER y^+ (SET PIN HIGH)
- FLOAT x^- AND x^+ (SET PINS AS INPUTS)
- READ V_{x^-} OR V_{x^+} WITH ADC (adc.read())
- USE EQ. 2 TO FIND DISTANCE y IN mm.

EVEN THOUGH THE TOUCH PANEL IS 2D WE CAN CONSIDER THE Z-AXIS TO REPRESENT IF THERE IS CONTACT W/ THE SCREEN.

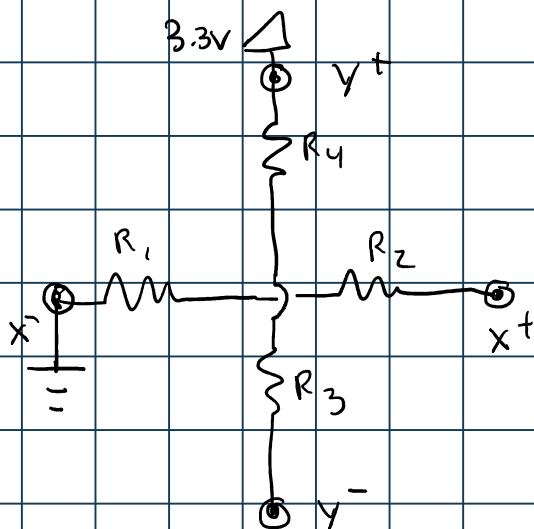
ASSUME CONTACT



NOTE:

- CURRENT FLOWS THROUGH R_1 AND R_4 BUT NOT R_2 AND R_3
- VOLTAGE AT CENTER NODE, V_2 , WILL BE BETWEEN 0V AND 3.3V

ASSUME NO CONTACT



NOTE:

- NO CURRENT FLOW AT ALL
- CENTER NODE WILL BE EITHER 0V IF MEASURED AT X^+ OR 3.3V IF MEASURED AT Y^-