Displays & More

Press Play: Interactive Device Design | July 07, 2011

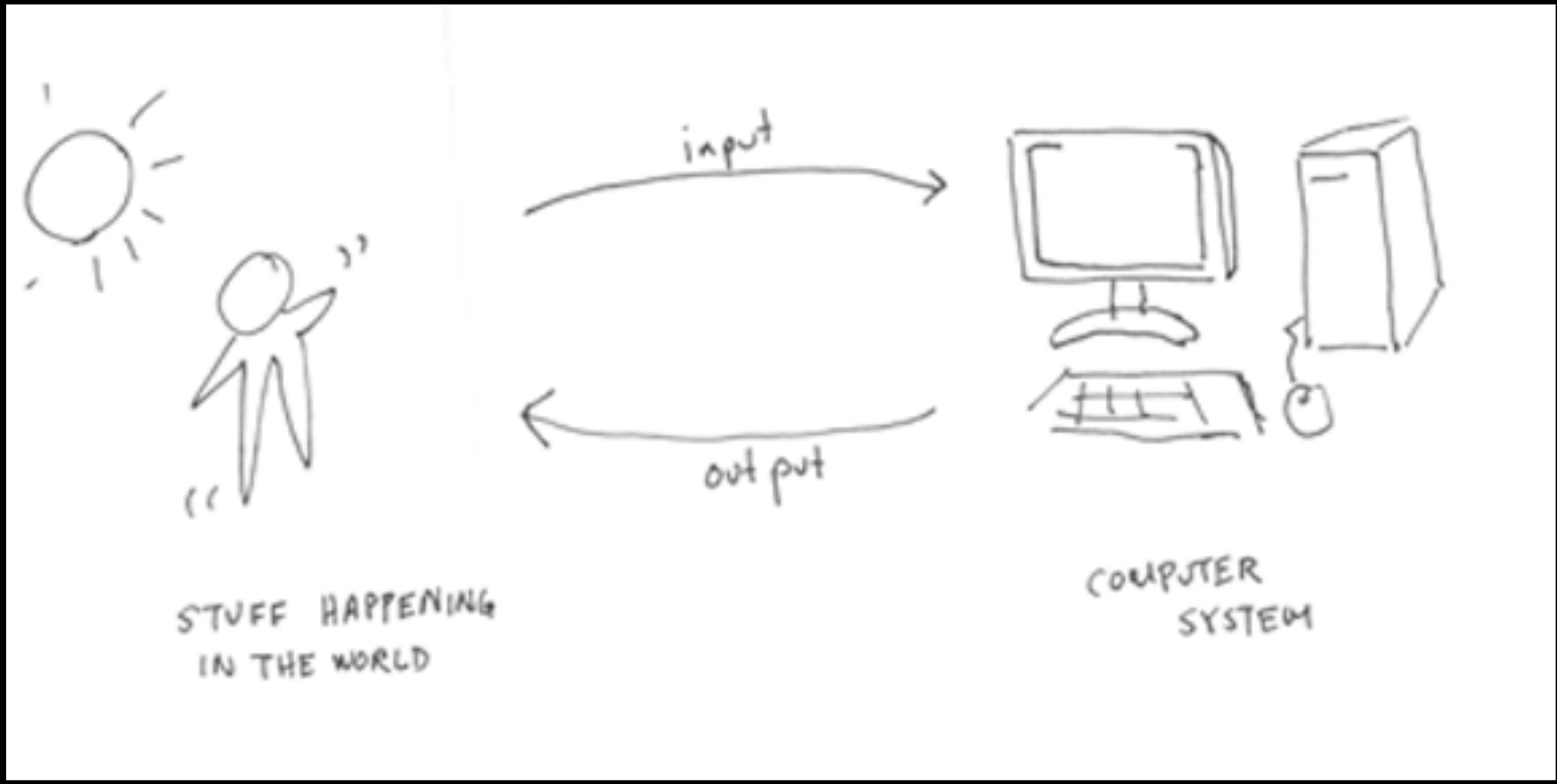
Homework Sharing

Discuss Schematics with Your Neighbor(s)

Describe/Show Your Re-Purposed Products

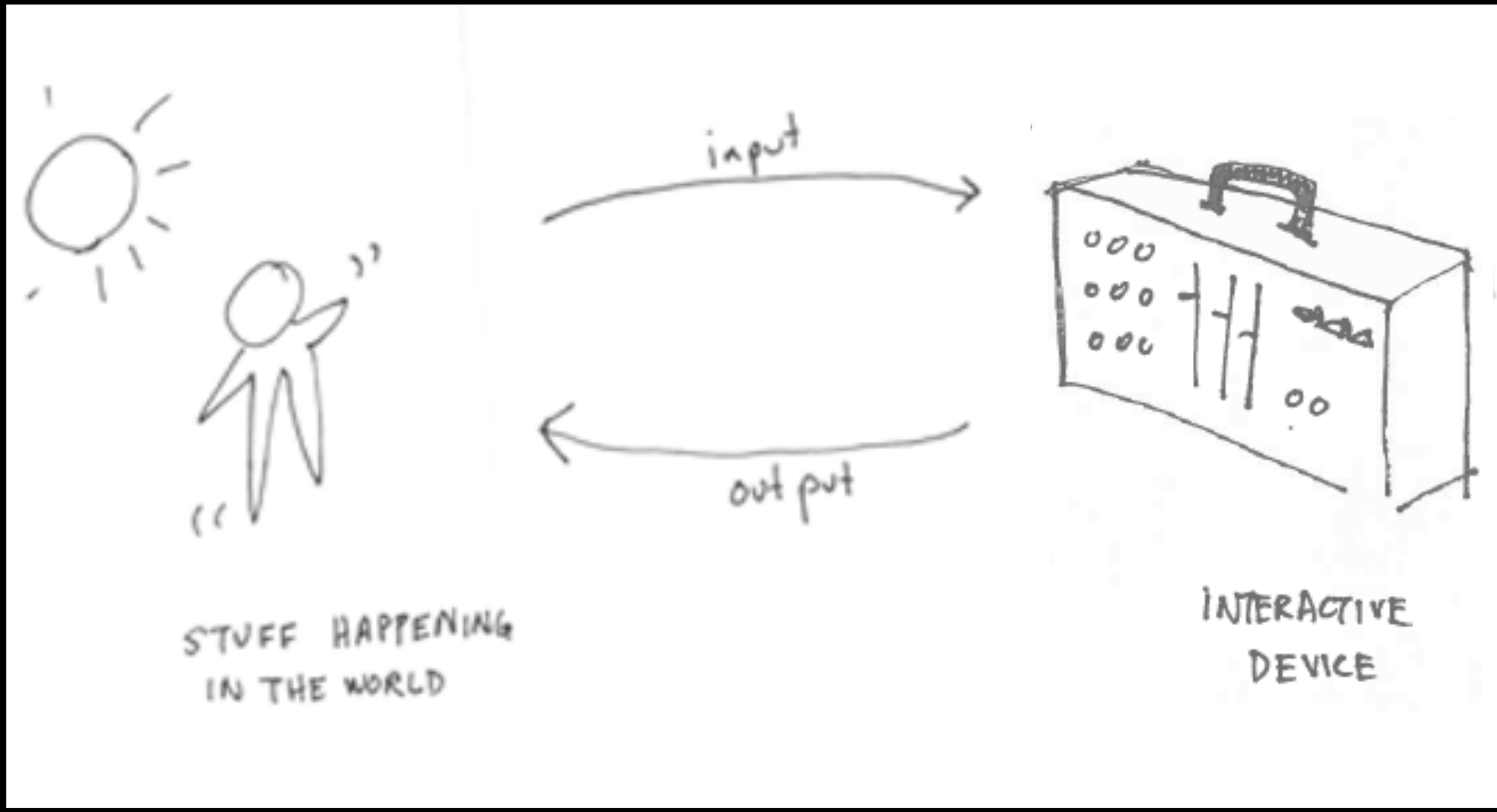
Interacting With Interactive Devices

Some Sketches



Interacting With Interactive Devices

Some Sketches



Interacting With Interactive Devices

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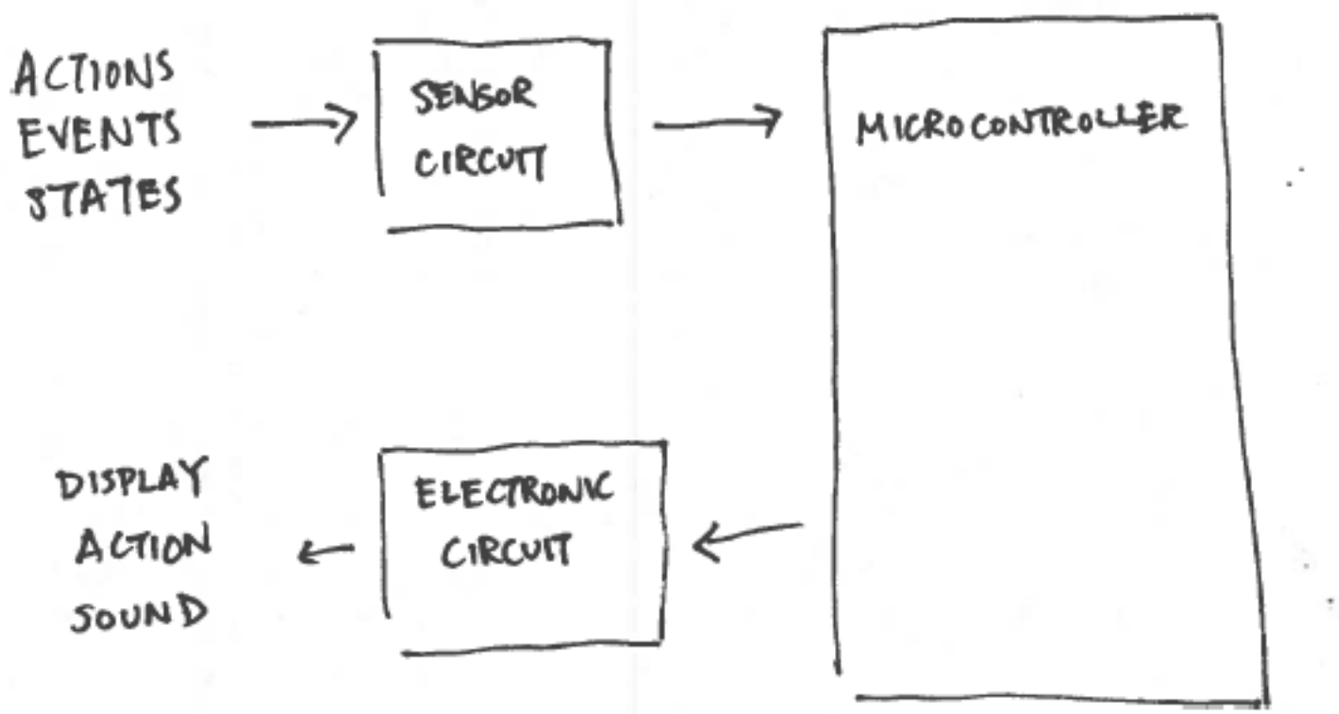

Interacting With Interactive Devices

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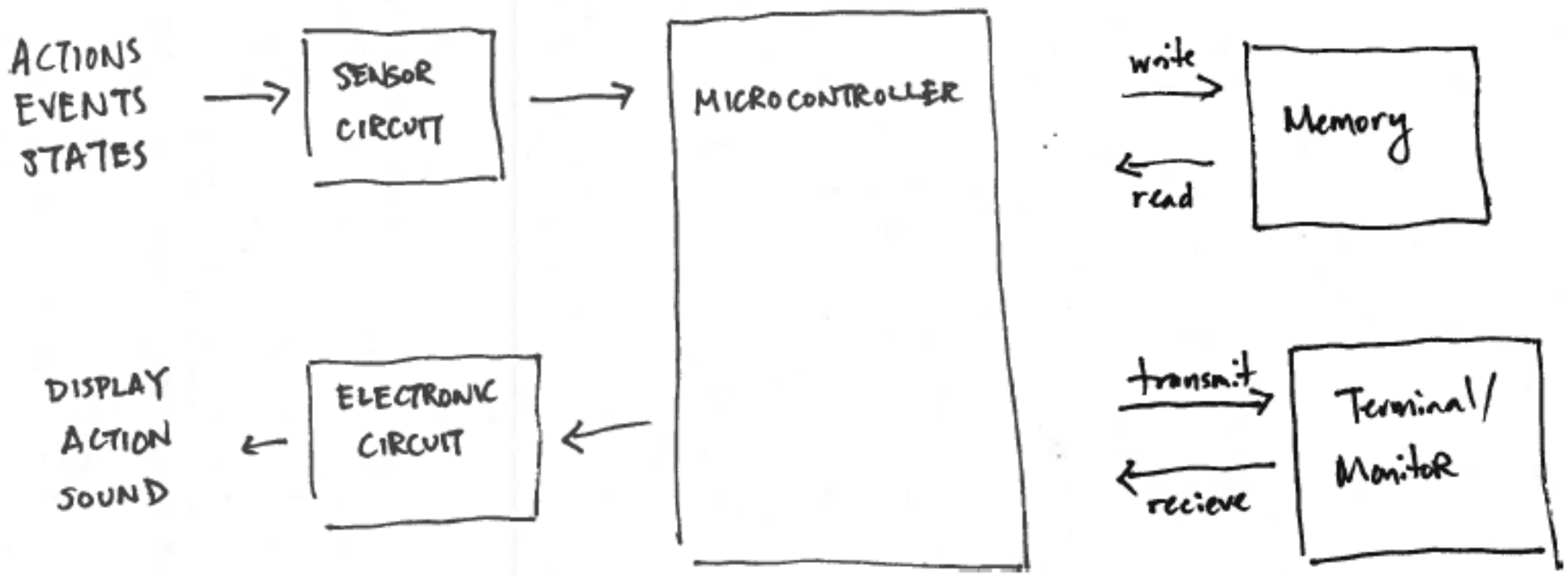
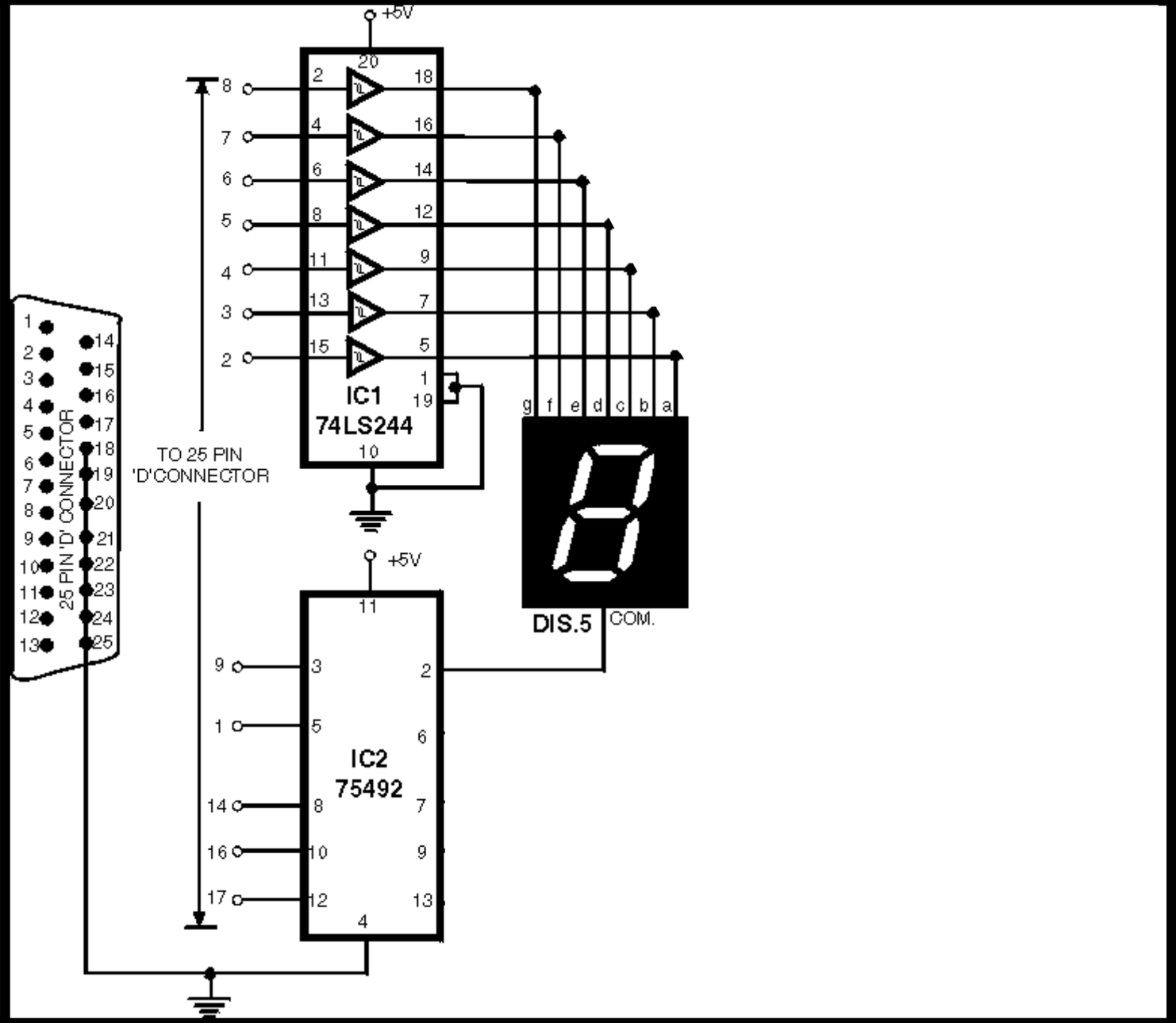


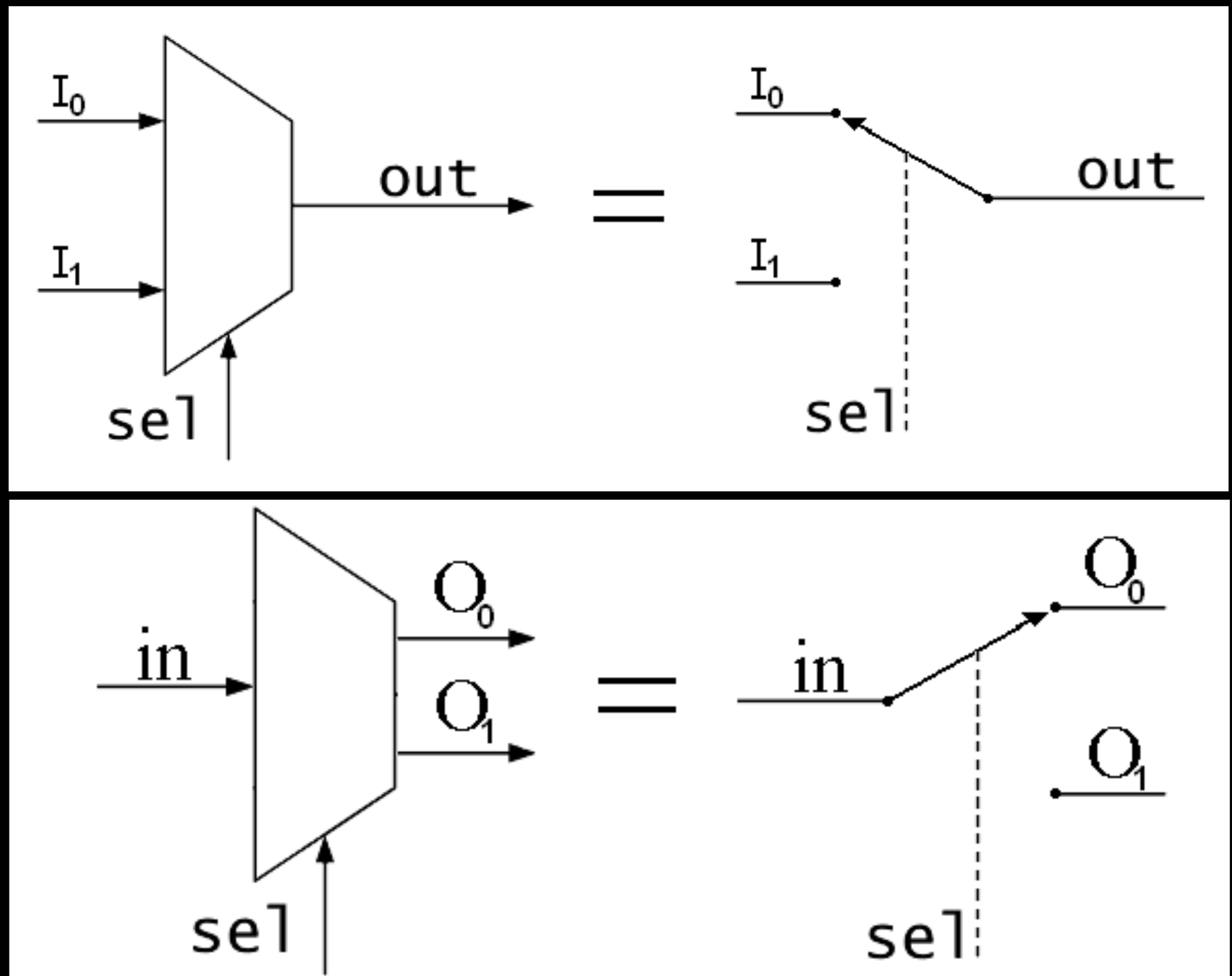
Displays

Variations on LEDs



Multiplexing

How Does It Work?



Displays

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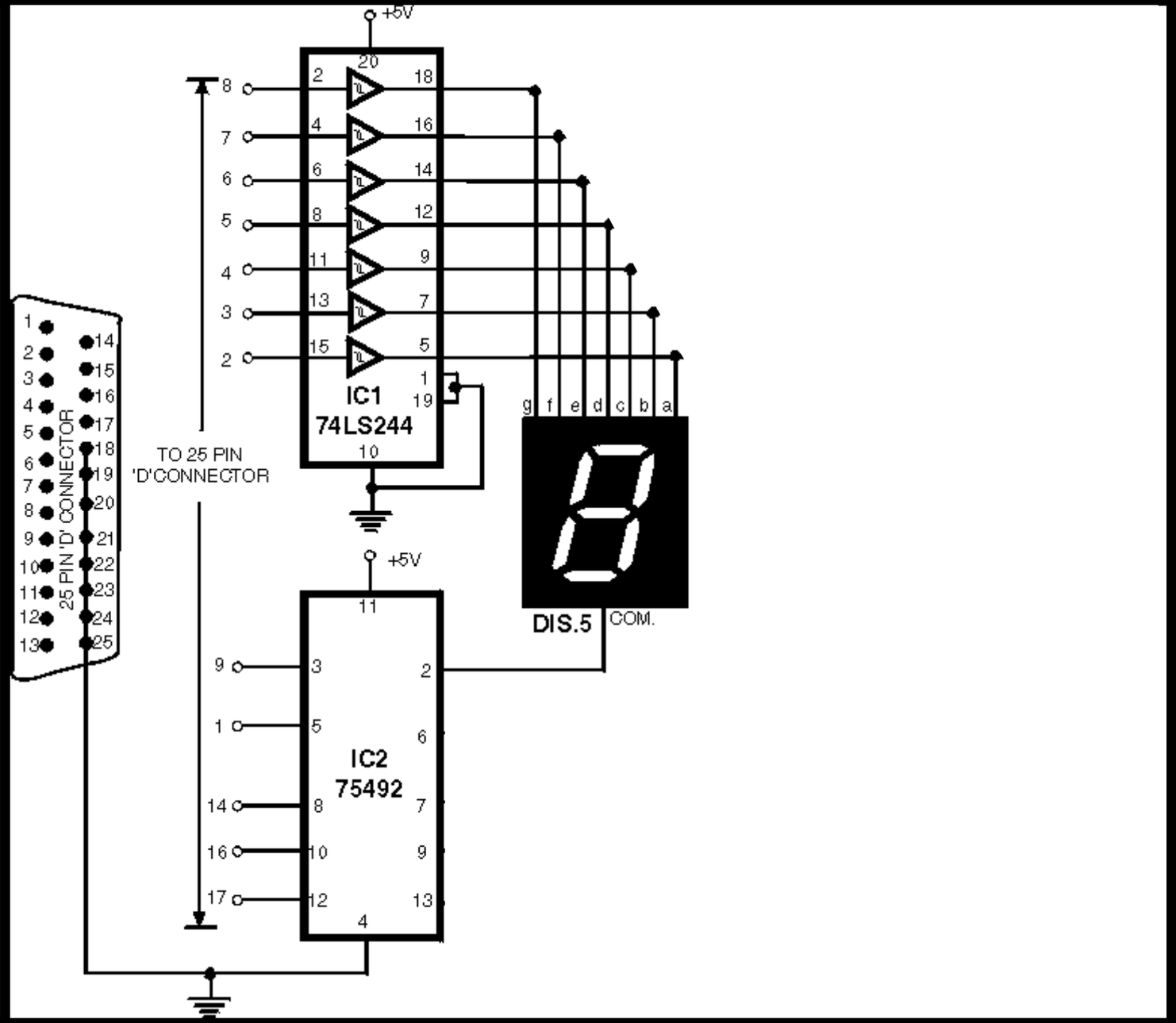

Displays

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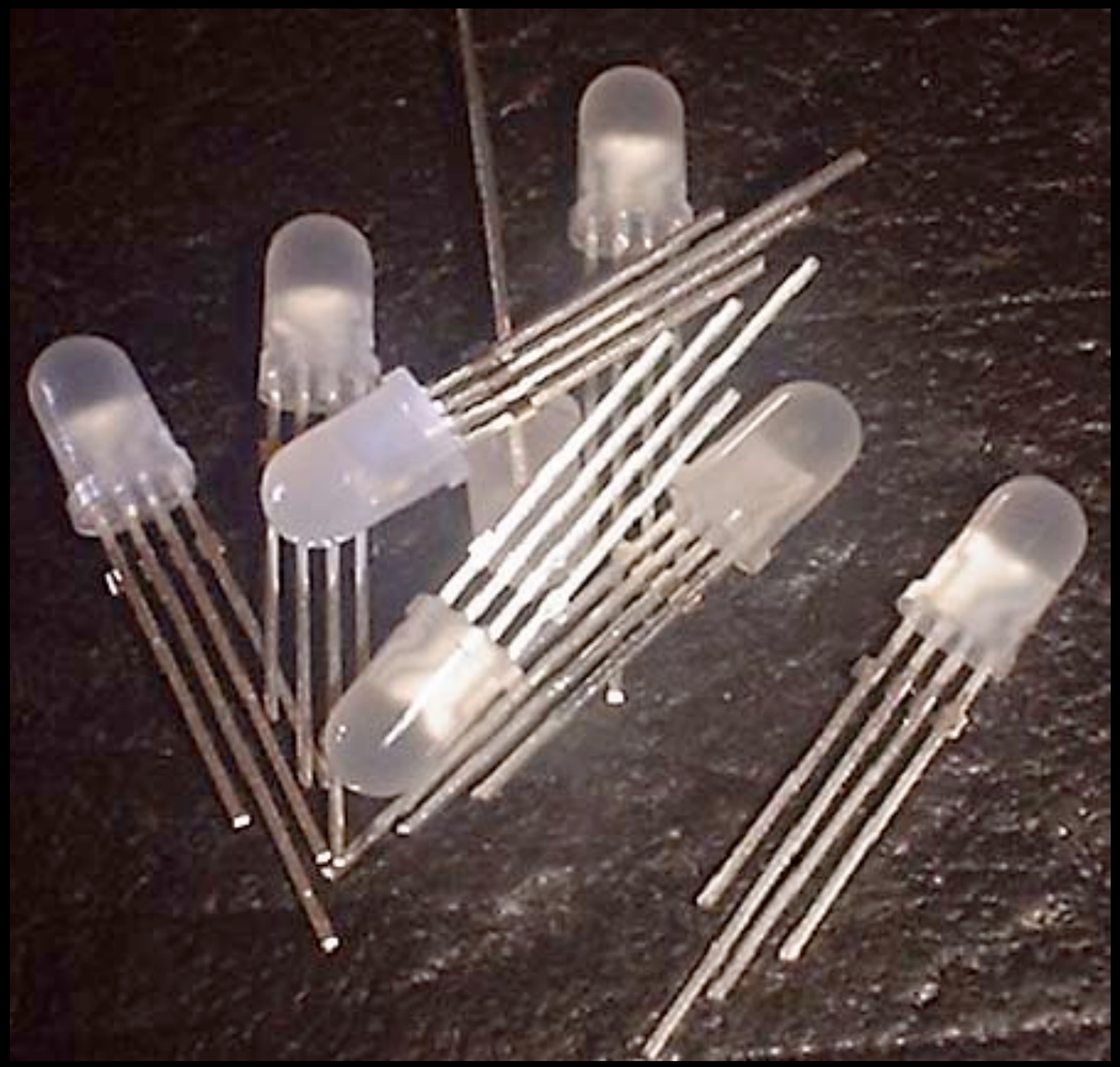

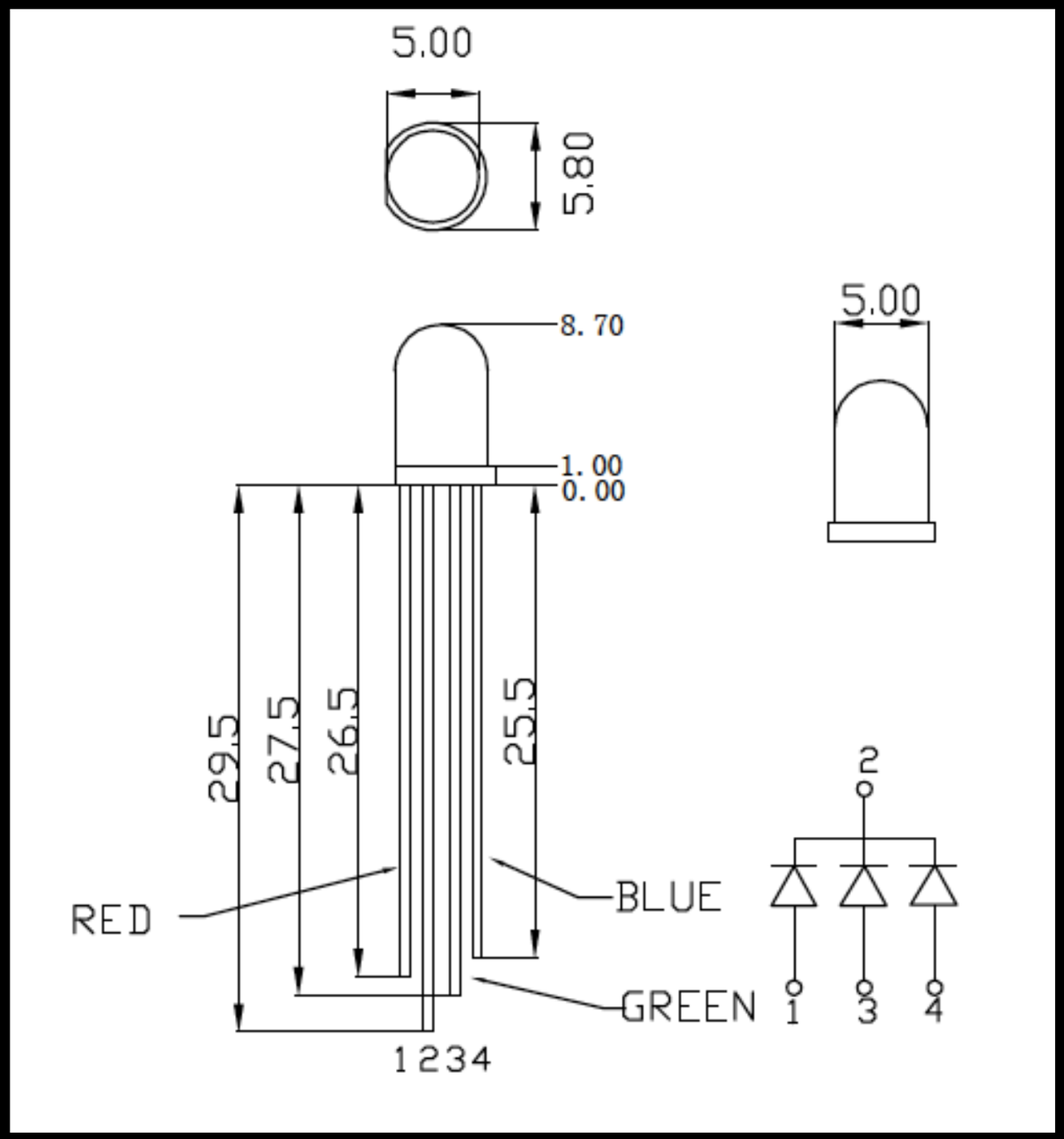

Displays

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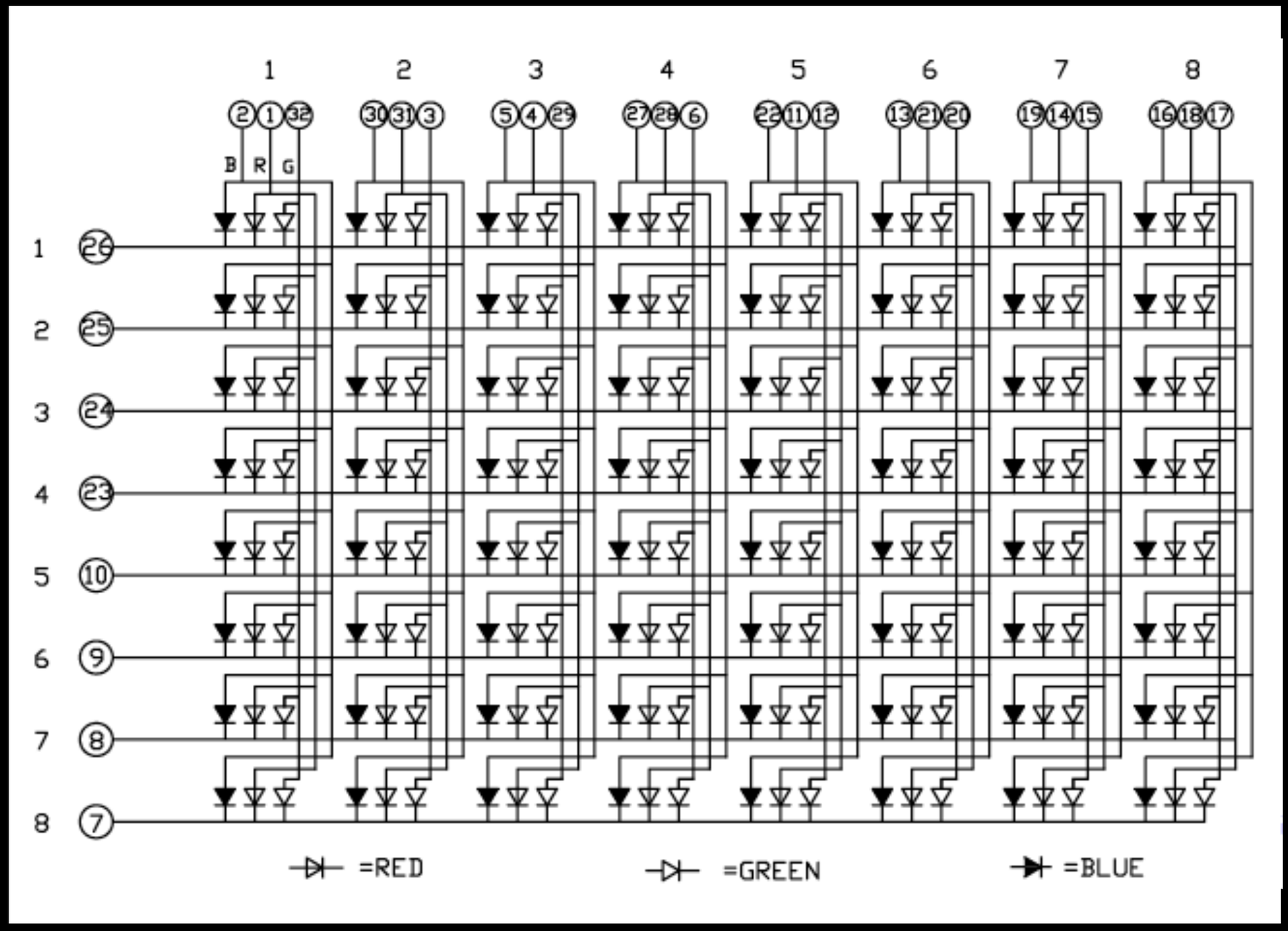


Displays

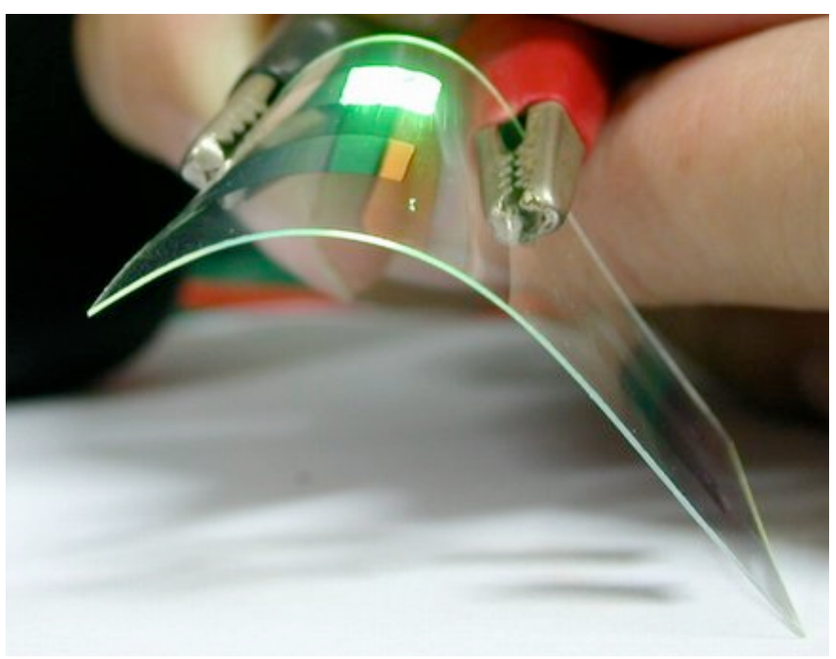
Character Displays

Variations:

- Dimensions
- # Columns & Rows
- Colors
- Voltages
- Backlight
- HD44780 Compatible
- Control Interfaces (Parallel vs. Serial)

Displays

Graphical Displays



Variations:

- Dimensions
- Pixel Width & Height
- LCD vs. OLED
- Voltages
- Backlight
- Color
- Control Interfaces

Voltage Regulation

Why Would We Want to Regulate Voltage?

The 3-Axis Accelerometer sensor will operate between 2.2 and 6 Volts. Because the MMA7361 chip only will deal with 3.6V maximum, the sensor is equipped with a low-dropout regulator so the sensor will work, out of the box, with an Arduino or other 5V microcontroller. At 5V the sensor draws around 50 uA with the shunt off and 100 uA with the shunt on. The current draw at 3.3V is 150 / 200 uA respectively.

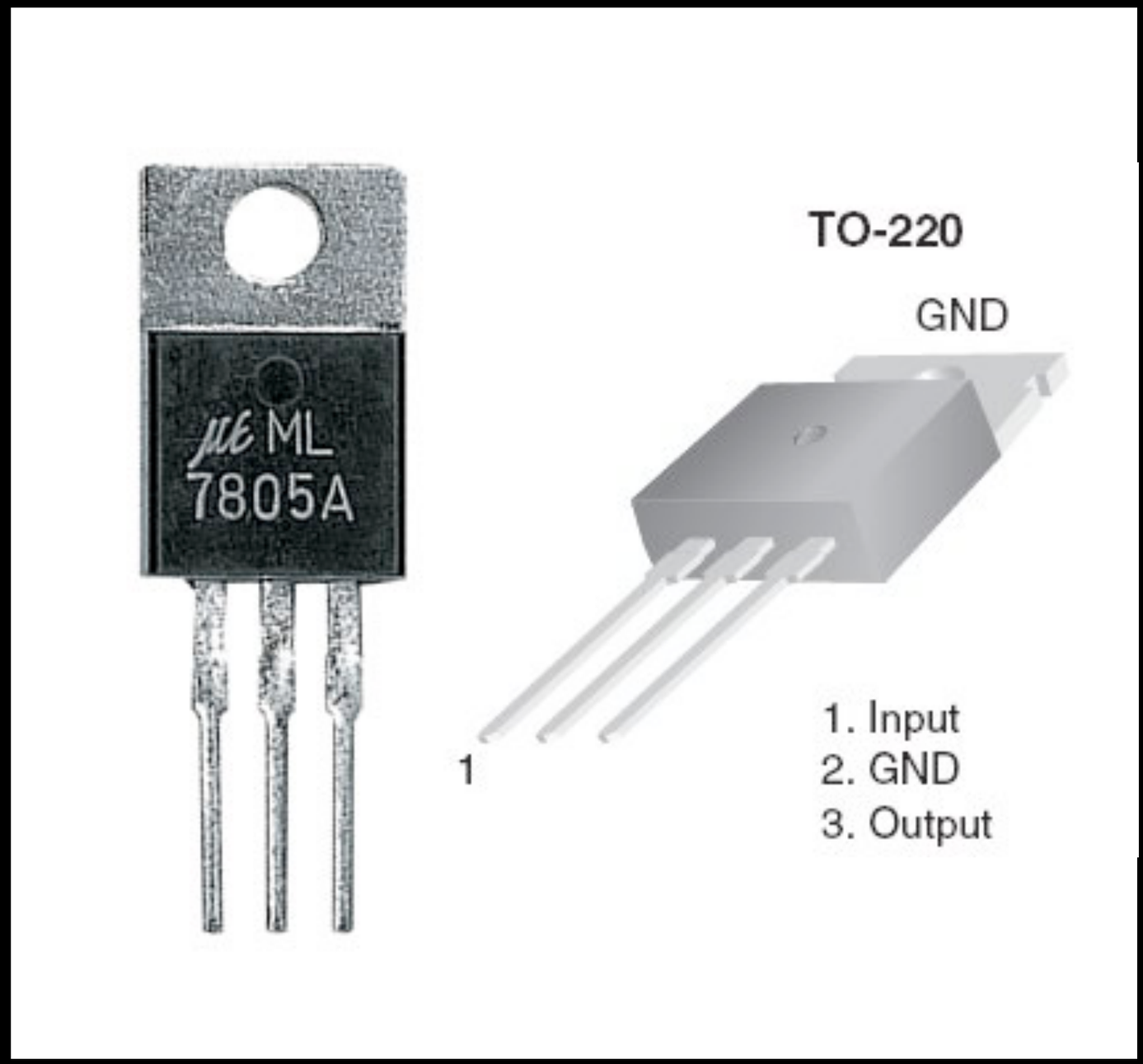
Voltage Regulation

How to Get the Voltage You Want

Check:

- [ ] Input/Output Voltages (LDO)
- [ ] Current Rating
- [ ] Package
- [ ] Classic 7805 Linear Regulator

The regulating device is made to act like a variable resistor, continuously adjusting a voltage divider network to maintain a constant output.



Voltage Regulation

How to Get the Voltage You Want

KIA7805AP/API

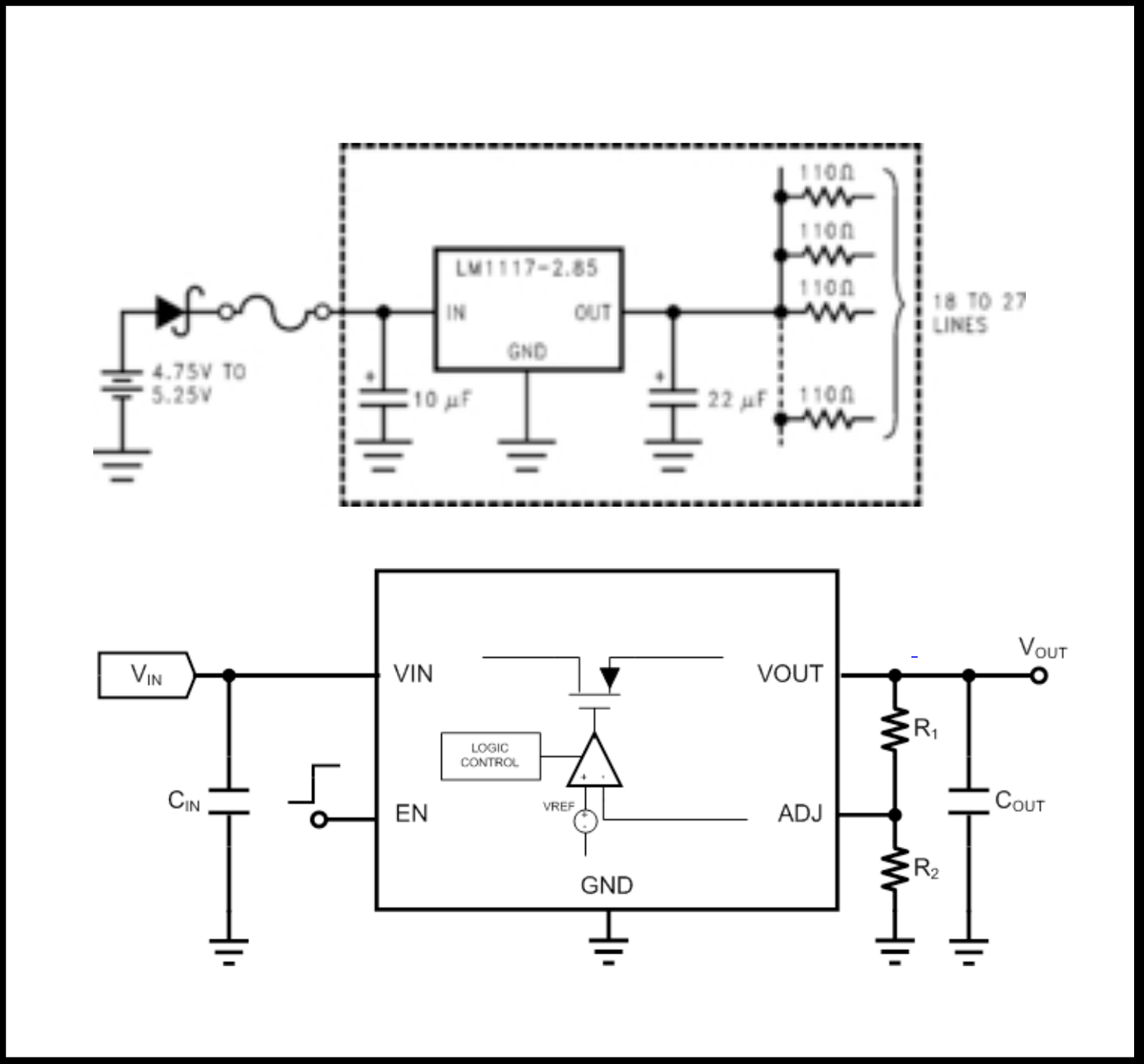
ELECTRICAL CHARACTERISTICS (V_{IN}=10V, I_{OUT}=500mA, 0℃ ≦ T_j ≦ 125℃)

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	1	T_j=25℃, I_{OUT}=100mA		4.8	5.0	5.2	V
Input Regulation	Reg line	1	T_j=25℃	7.0V ≦ V_{IN} ≦ 25V	-	3	100	mV
				8.0V ≦ V_{IN} ≦ 12V	-	1	50	
Load Regulation	Reg load	1	T_j=25℃	5mA ≦ I_{OUT} ≦ 1.4A	-	15	100	mV
				250mA ≦ I_{OUT} ≦ 750mA	-	5	50	
Output Voltage	V_{OUT}	1	7.0V ≦ V_{IN} ≦ 20V 5.0mA ≦ I_{OUT} ≦ 1.0A, Po ≦ 15W		4.75	-	5.25	V
Quiescent Current	I_B	1	T_j=25℃, I_{OUT}=5mA		-	4.2	8.0	mA
Quiescent Current Change	ΔI_B	1	7.0V ≦ V_{IN} ≦ 25V		-	-	1.3	mA
Output Noise Voltage	V_{NO}	1	Ta=25℃, 10Hz ≦ f ≦ 100kHz I_{OUT}=50mA		-	50	-	μV_{rms}

Voltage Regulation

How to Get the Voltage You Want

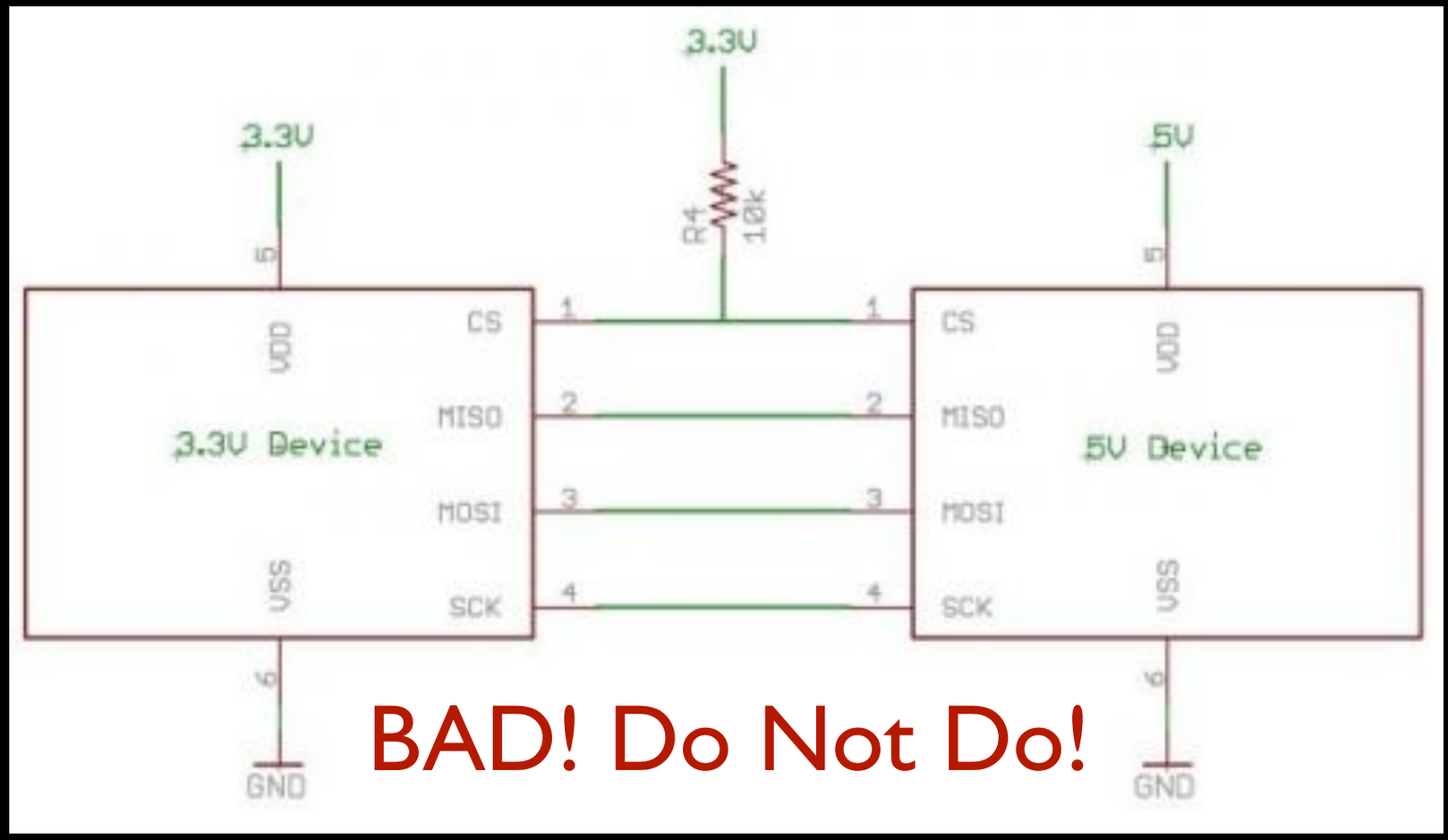
- LM1117—3.3V 800mA Low Drop Out (LDO) Linear Regulator
- Also available in 1.8V, 2.5V, 2.85V, 3.3V, 5V and adjustable versions.



Voltage Level Shifting

Why Would We Want to Shift the Voltage?

- Why are there different voltages anyway?
- What can go wrong when connecting 3.3V & 5V devices?



BAD! Do Not Do!

http://www.sparkfun.com/commerce/tutorial_info.php?tutorials_id=65

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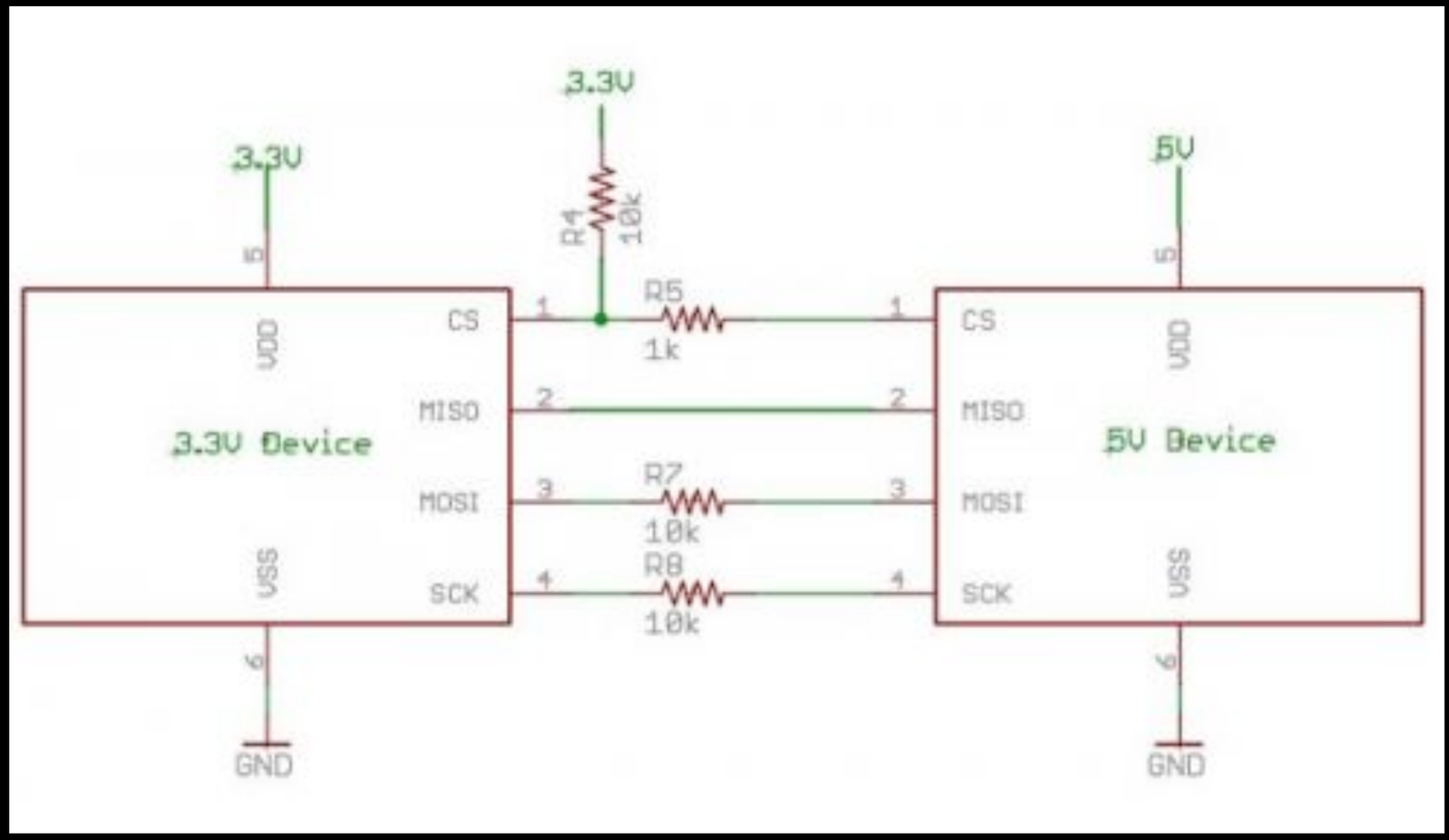

Inline Resistor Method

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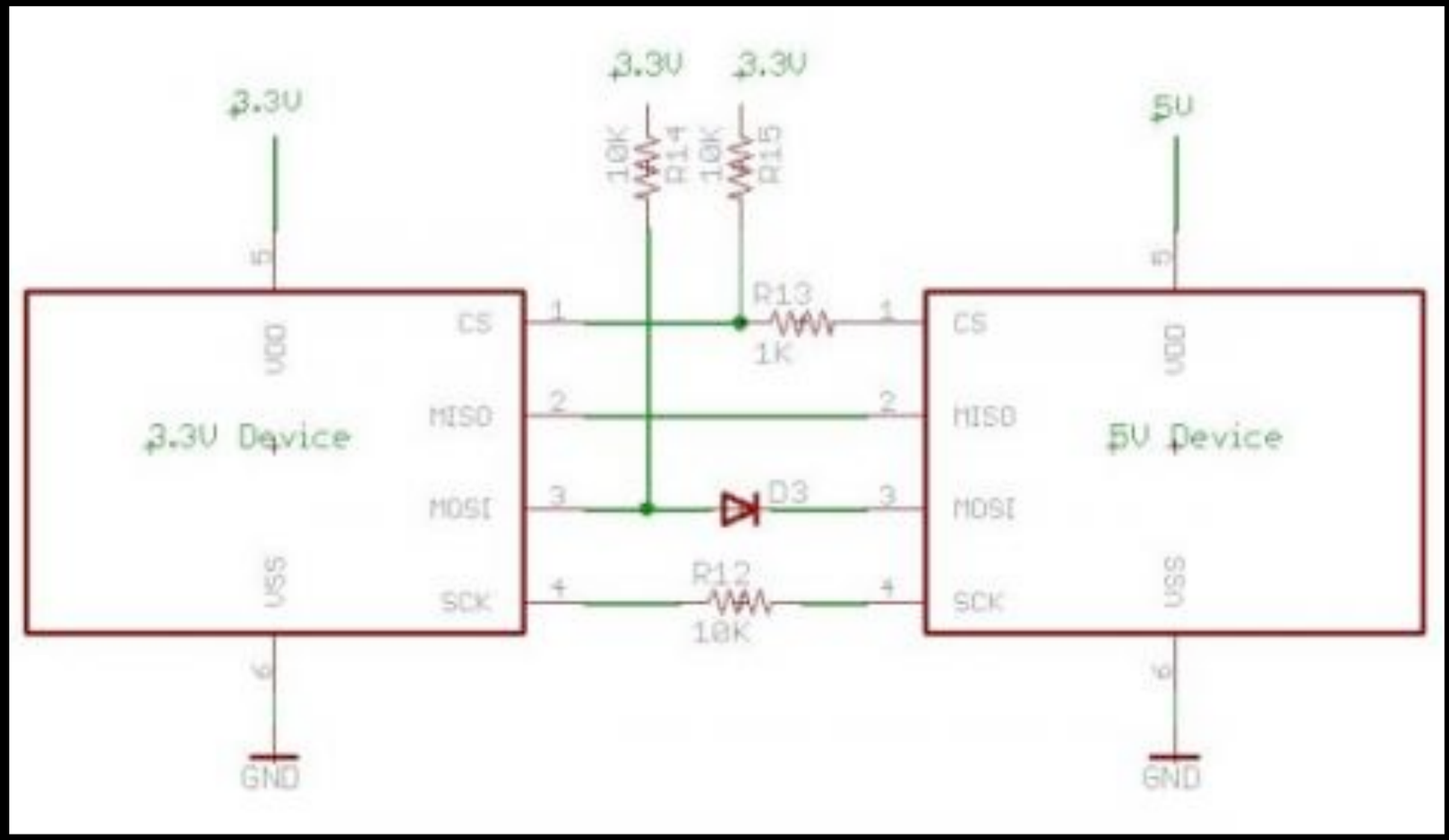

Reverse Diode Method

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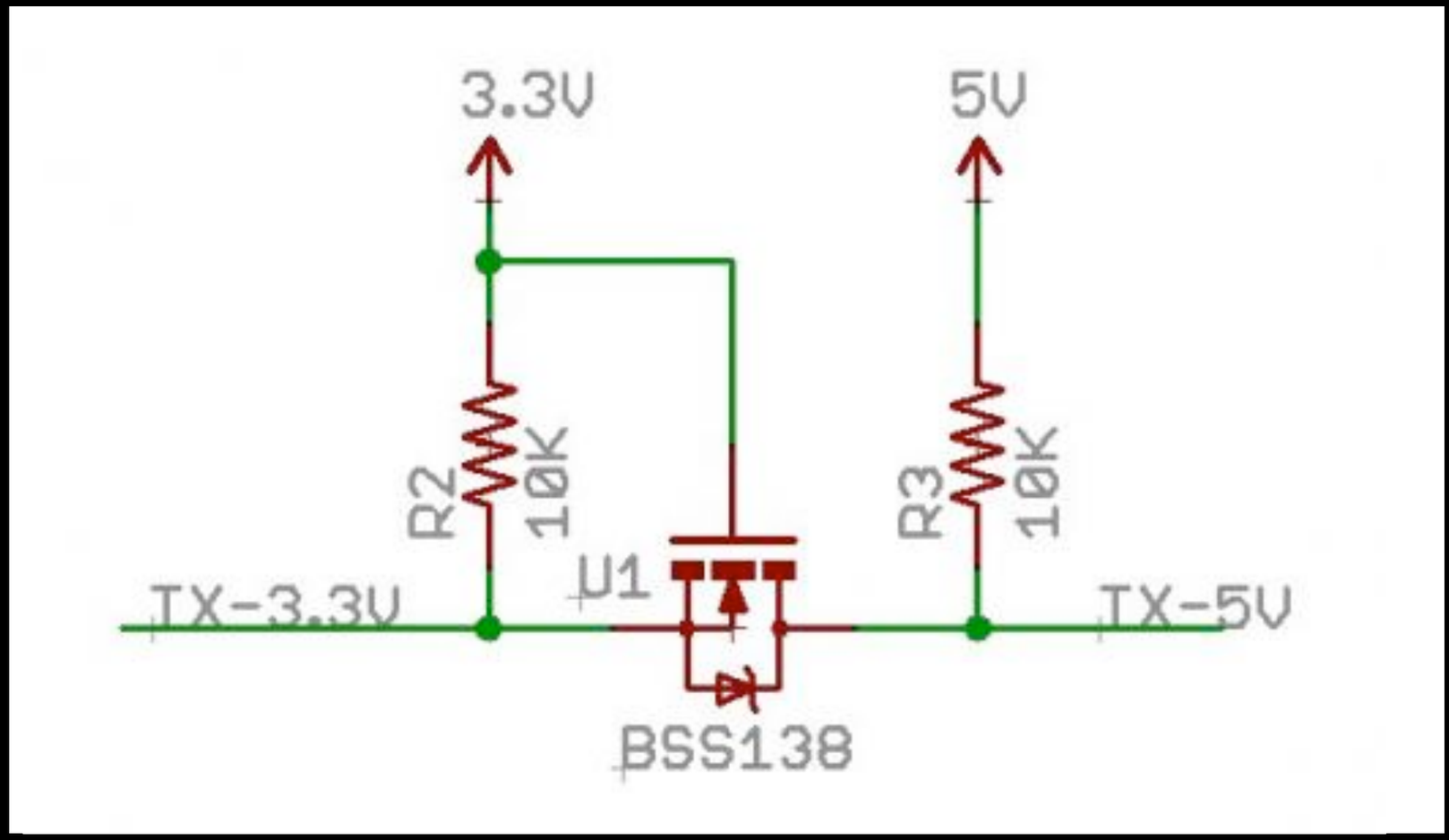

MOSFET (Metal Oxide Semiconductor Field Effect Transistor) Method

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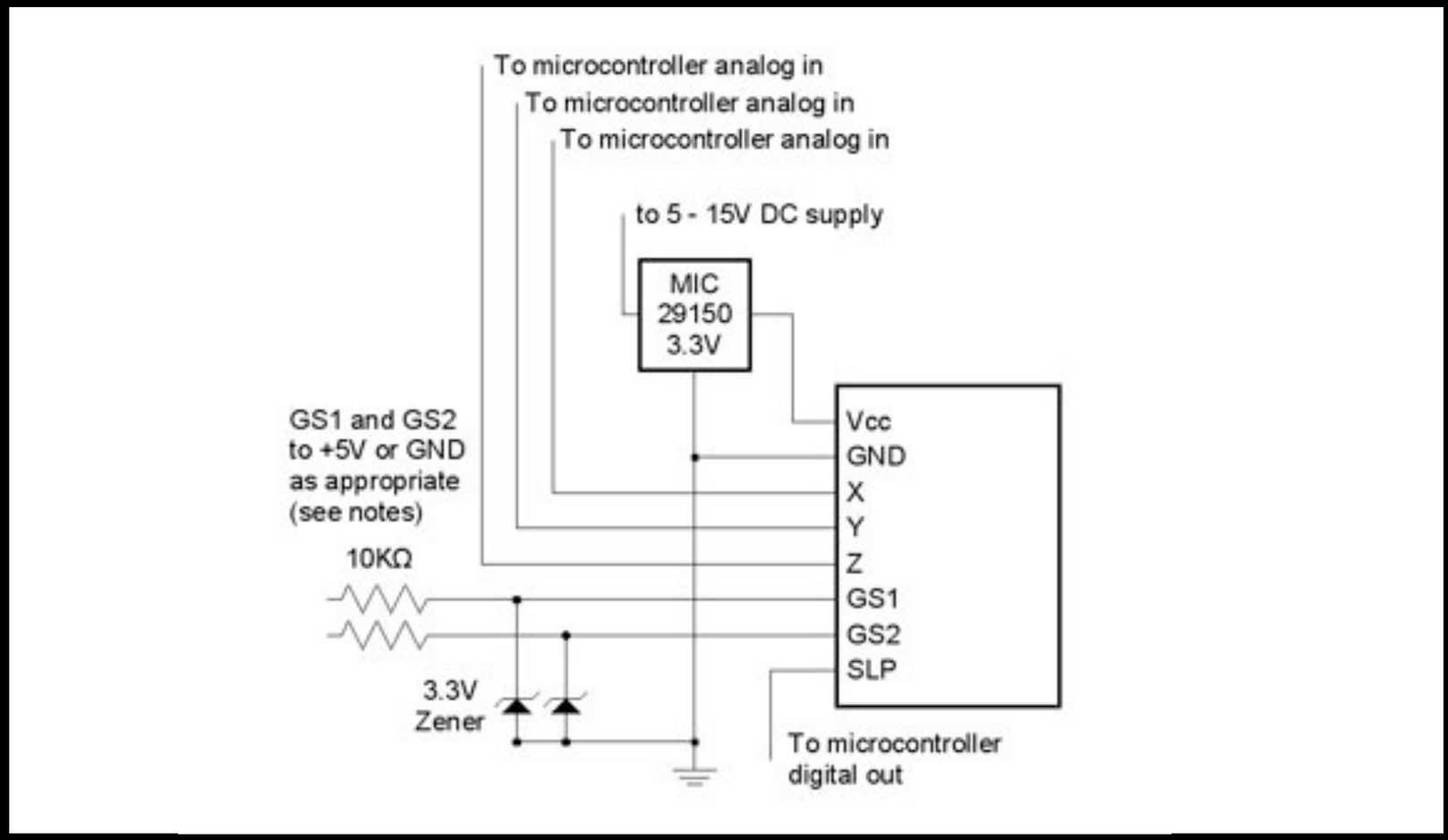

Zener Diode Method

http://itp.nyu.edu/physcomp/sensors/Reports/MMA7260Q

Lab 4 Preview: Data Logger

Sound! Lights! Acceleration! Gesture!

Using the Serial Monitor

Writing to the EEPROM

Homework for Next Week

5 Photos of People Listening | 2 Verplank Diagrams