

## I-AN DISTANCE MEASUREMENT DIY

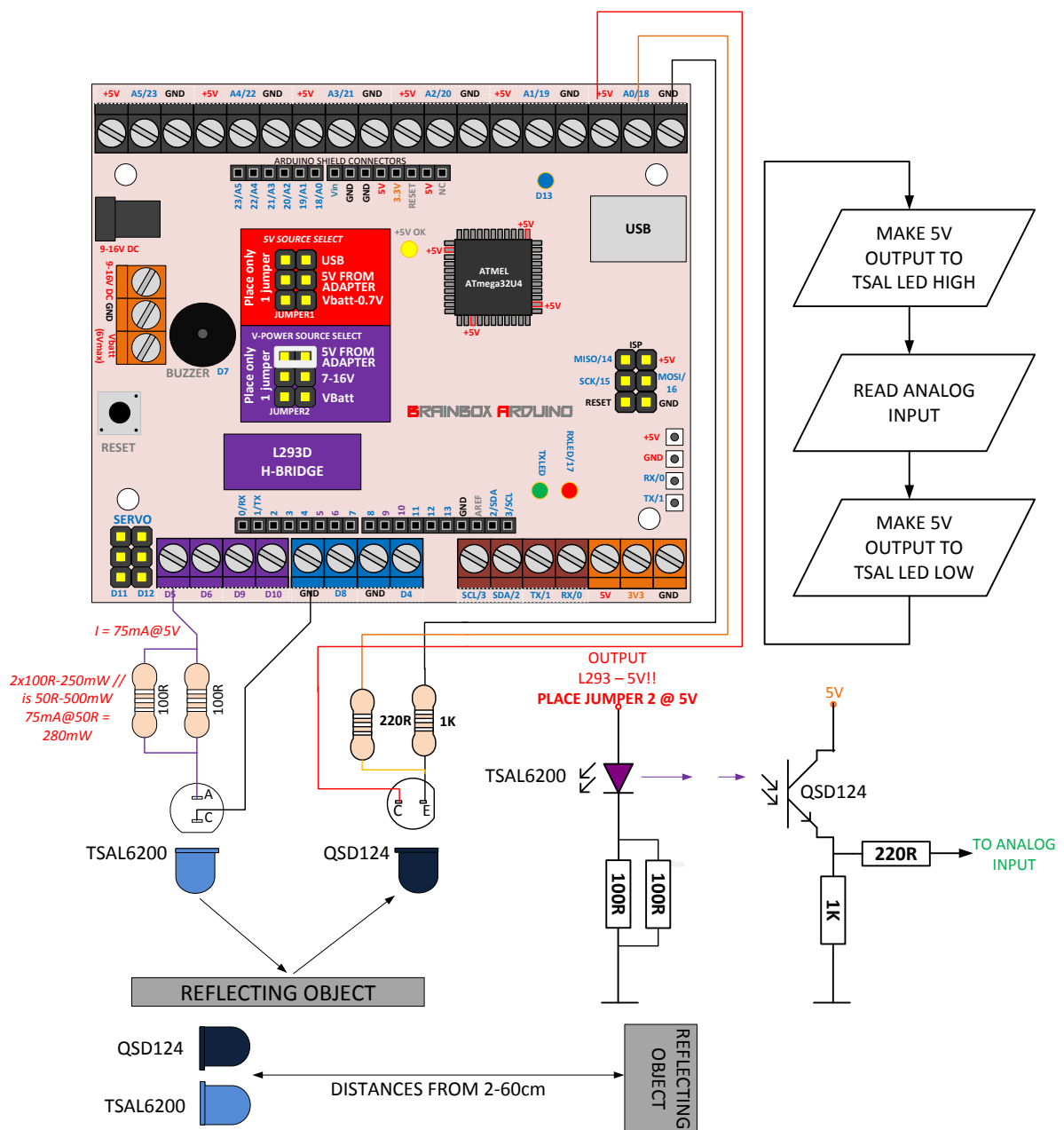
Required knowledge Led, infrared light, Phototransistor

This sensor operates with a transmitter and a receiver. The transmitted Infrared beam reflects at an object. How closer the object, how more light is reflected and how more light is measured in the receiver sensor.

**Photo Transistor – Infrared light – led – infrared led – IR LED – IR**

**Phototransistor**

**TSAL6200 datasheet – QSD124 datasheet**



Components:

IR Emitter TSAL6200 (alt for TSAL5100)	Farnell: 3152856
IR Photo Transistor QSD124 (alt for BPV11F)	Farnell: 2453253
4 Resistors – 250mW	100R, 100R, 1K, 220R

Industrial distance sensors are expensive. We can build one for less than 0.5€. This sensor is tested for distances between 5 and 40cm, but larger distances are possible if you send more current through the TSAL6200. The measured result is not linear.

**Transmitter: TSAL6200 IR emitter from Vishay.**

We choose for IR light because this is not disturbed by other light sources. (Be aware that sunlight does also contain IR light and that sunlight can disturb the measurement) This TSAL6200 needs about 75mA to operate properly, so we will use one of the 4 600mA outputs (D5,D6,D9,D10) at 5Volt to provide this current. Make sure that the jumper of 'VPOWER SOURCE SELECT' is placed in the 5V position and that the adapter is connected. The 600mA outputs will not operate at USB power.

**Receiver sensor: QSD124**

This sensor has an extra dark filter that only lets the IR signals through to the Phototransistor. When more IR light reflects from the object – the transistor will saturate more and the voltage over this resistor that is used as the input for the uC rises.

**distance smaller >> reflecting object closer >> more reflecting IR light >> transistor more in saturation >> Voltage over R(1K) rises = input voltage uc**

We will read the analog input of the QSD124 sensor at one of the 6 analog input pins.

Activate TSAL6200

CODE EXAMPLE: 'O-500'

Read analog input from QSD124

CODE EXAMPLE: 'I-AN'