analog multiplexer/demultiplexer----------4051

A multiplexer or demultiplexer enable you to expand the in- and outputs on your Arduino board. The 4051 is an 8 channel analog multiplexer / demultiplexer, thus:

*If you use the 4051 as a Multiplexer: You can choose between 8 different inputs and select just one you wane read at the time.
*If you use the 4051 as a Demultiplexer you can choose between 8 different outputs and select just one you wane write at the time.

Futher more is the 4051 able to work with analog values; in the case of Arduino you are able to use analog Inputs with a voltage between o-5V and rout them to a AnalogIn Pin on your Arduino.

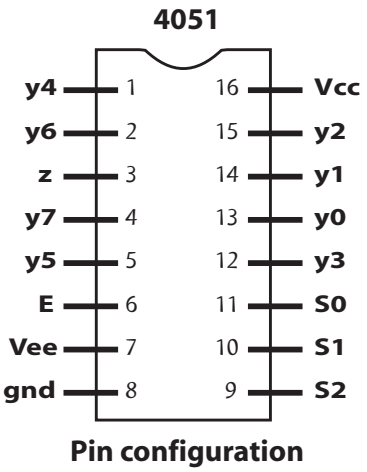
8 Analog Inputs ▶ ▶ ▶ **1 Analog Output**

Selected through 3 digital Outpins from the arduino

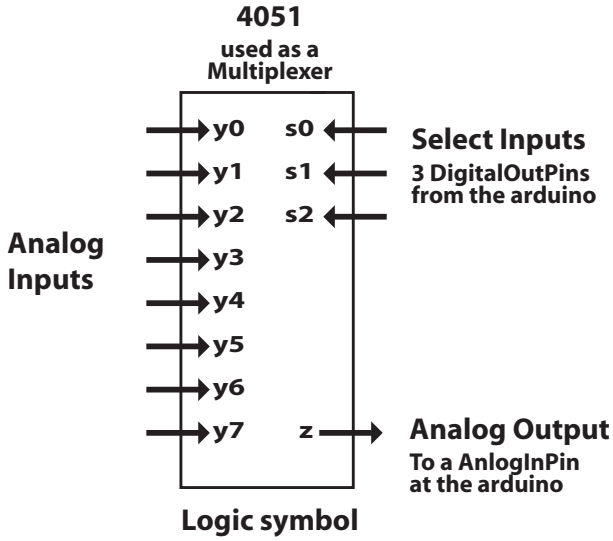
To select the Pin we would like to read or write, we have to use the three Select Pins (S0, S1 and S2). Each of this pins have to be connected to one digitalOut Pin on the Arduino. Every pin is representing a number (So = 1; S1 = 2; S2 = 4) and if we set one of this Select pins to HIGH the curtained number the pin is representing will be transmitted to the 4051. For example:

*If S0 and S1 are HIGH and S2 is LOW pin y3 is selected (1+2+0 = 3).
*If S0 and S2 is HIGH and S1 LOW pin y5 is selected (1+0+4 = 5).

It is not possible to read or write more then one pin on the 4051 at the same time, because you can just select one pin at the same time. But you can read and write this pins quit fast. There is no delay needed between selecting and read or writing the pin.



Pin configuration



Logic symbol

Z ----- common input/output (connected to Arduino Input/Output)
E ----- enable input (active LOW) (connected to ground (gnd))
Vee --- negative supply voltage (connected to ground (gnd))
gnd --- ground (0 V)
S0-S2 - select inputs (connected to three arduino digitalOut Pins)
y0-y7 - independent inputs/outputs
Vcc --- positive supply voltage (5v)

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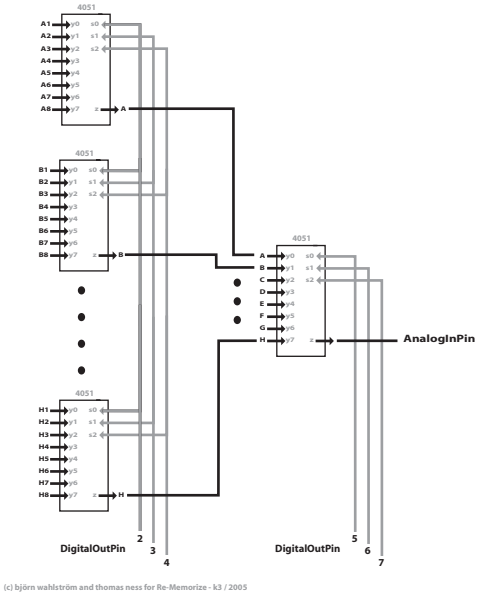

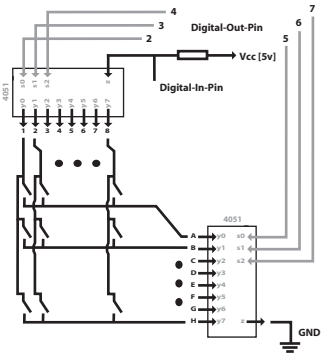

The left sketch above is an example how to use 9 multiplexer to read 64 analog Inputs just with one Analog-In-Pin on the arduino. The right sketch above is an example how to use two 4051 (one as demultiplexer and one as multiplexer) in a 8x8 Matrix to check 64 buttons or other digital Inputs just with one digital-In-Pin on the arduino(in this setup you can just have two buttons turned on at the same time).

```
/*
 * codeexample for useing a 4051 * analog multiplexer / demultiplexer
 * by david c. and tomek n.* for k3 / malmö högskola
 *
 */

int led = 13;    //just a led
int r0 = 0;      //value select pin at the 4051 (s0)
int r1 = 0;      //value select pin at the 4051 (s1)
int r2 = 0;      //value select pin at the 4051 (s2)
int row = 0;     // storeing the bin code
int count = 0;    // just a count
int  bin [] = {000, 1, 10, 11, 100, 101, 110, 111};//bin = binär, some times it is so easy

void setup(){

  pinMode(2, OUTPUT);    // s0
  pinMode(3, OUTPUT);    // s1
  pinMode(4, OUTPUT);    // s2
 digitalWrite(led, HIGH);
  beginSerial(9600);
}

void loop () {

  for (count=0; count<=7; count++) {
    row = bin[count];
    r0 = row & 0x01;
    r1 = (row>>1) & 0x01;
    r2 = (row>>2) & 0x01;
    digitalWrite(2, r0);
    digitalWrite(3, r1);
    digitalWrite(4, r2);
    //Serial.println(bin[count]);
    delay (1000);
  }
}
```

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