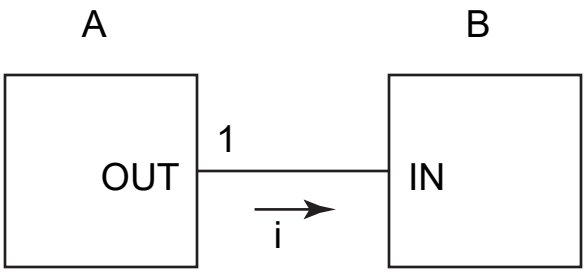
Judah Ben-Eliezer

112352727
10/14/2020

Lab 4:

Hardware Switch Debouncing and Conditional I/O

Interface Checklist (revised 10/09/17)
ESE280 Ken Short

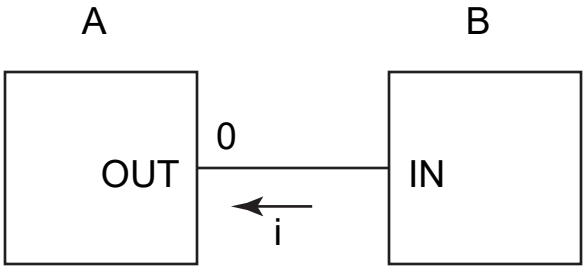


$V_{OHmin(A)} > V_{IHmin(B)}$

2.4 V > 2.31 V

$I_{OHmax(A)} > I_{IHmax(B)}$

7.5mA > 4 mA

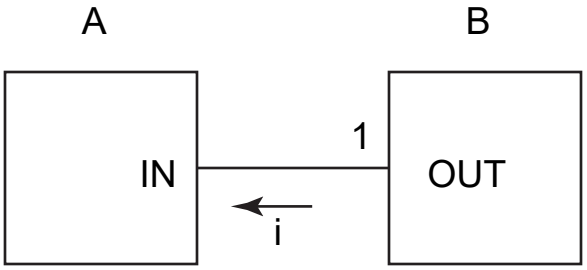


$V_{OLmax(A)} < V_{ILmax(B)}$

0.6 V < 1.35 V

$I_{OLmax(A)} > I_{ILmax(B)}$

0.05 uA > 1000 nA

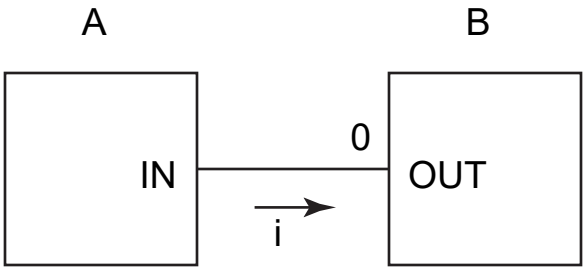


$V_{IHmin(A)} < V_{OHmin(B)}$

_____ < _____

$I_{IHmax(A)} < I_{OHmax(B)}$

_____ < _____

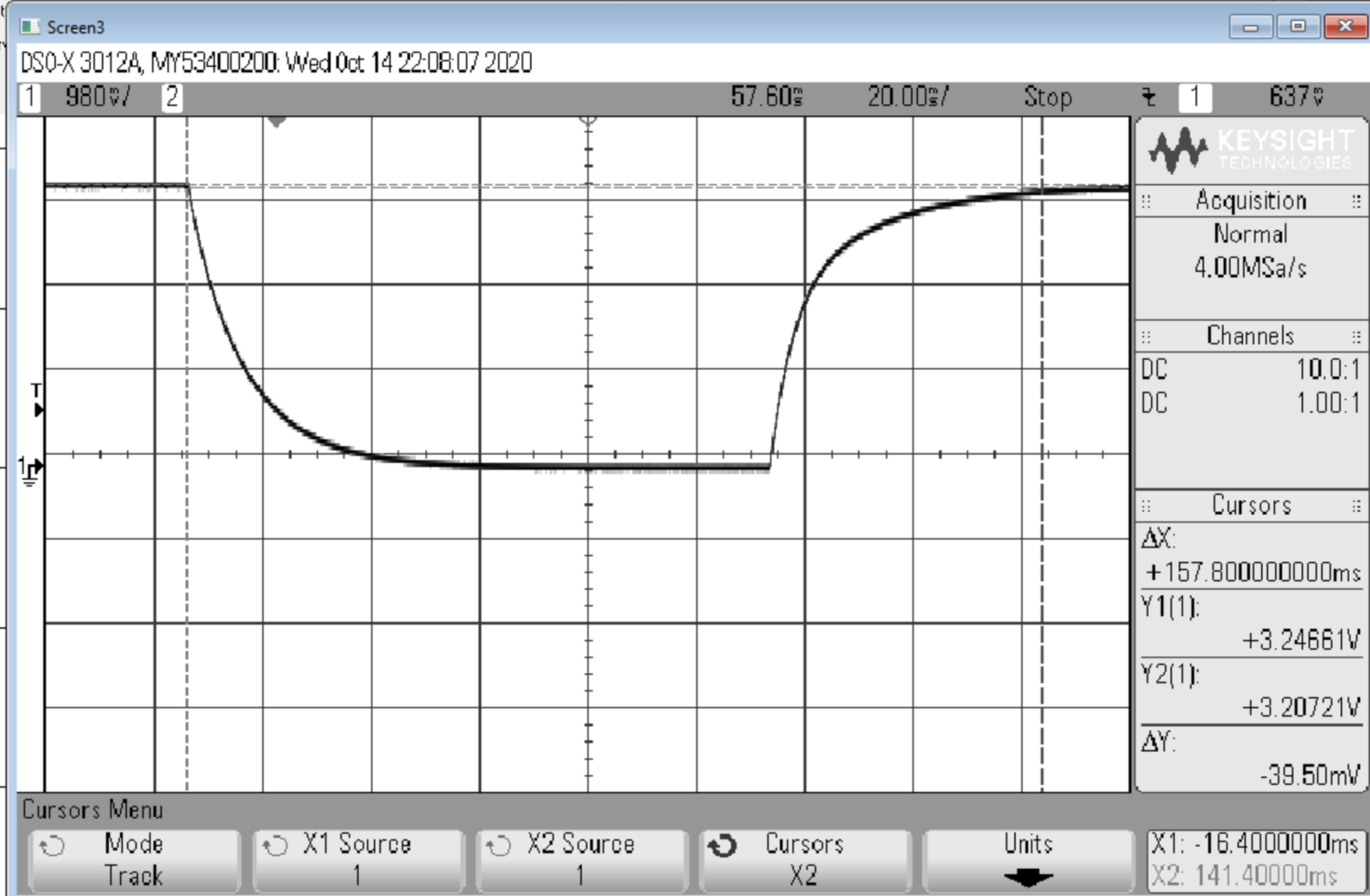


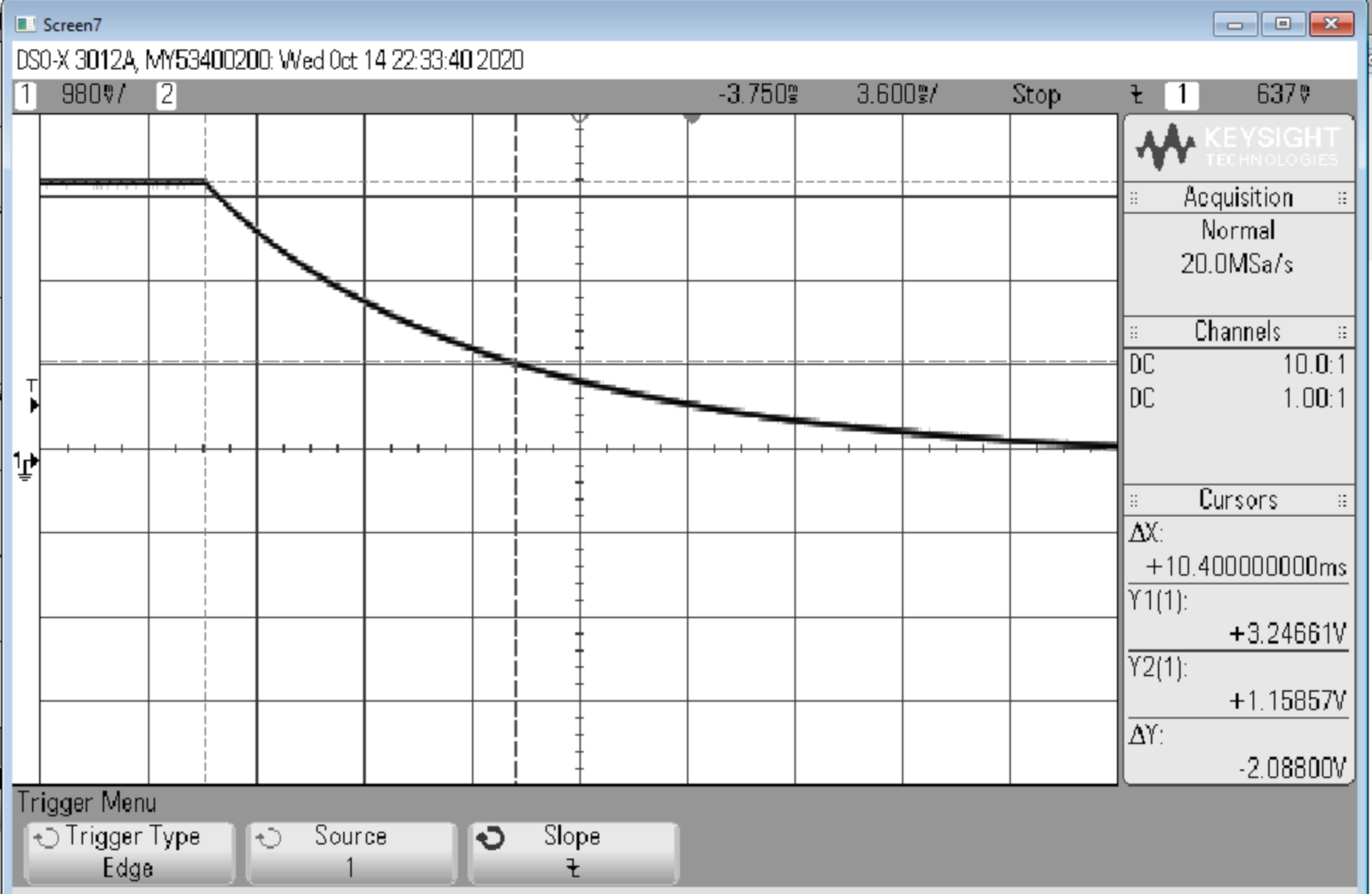
$V_{ILmax(A)} > V_{OLmax(B)}$

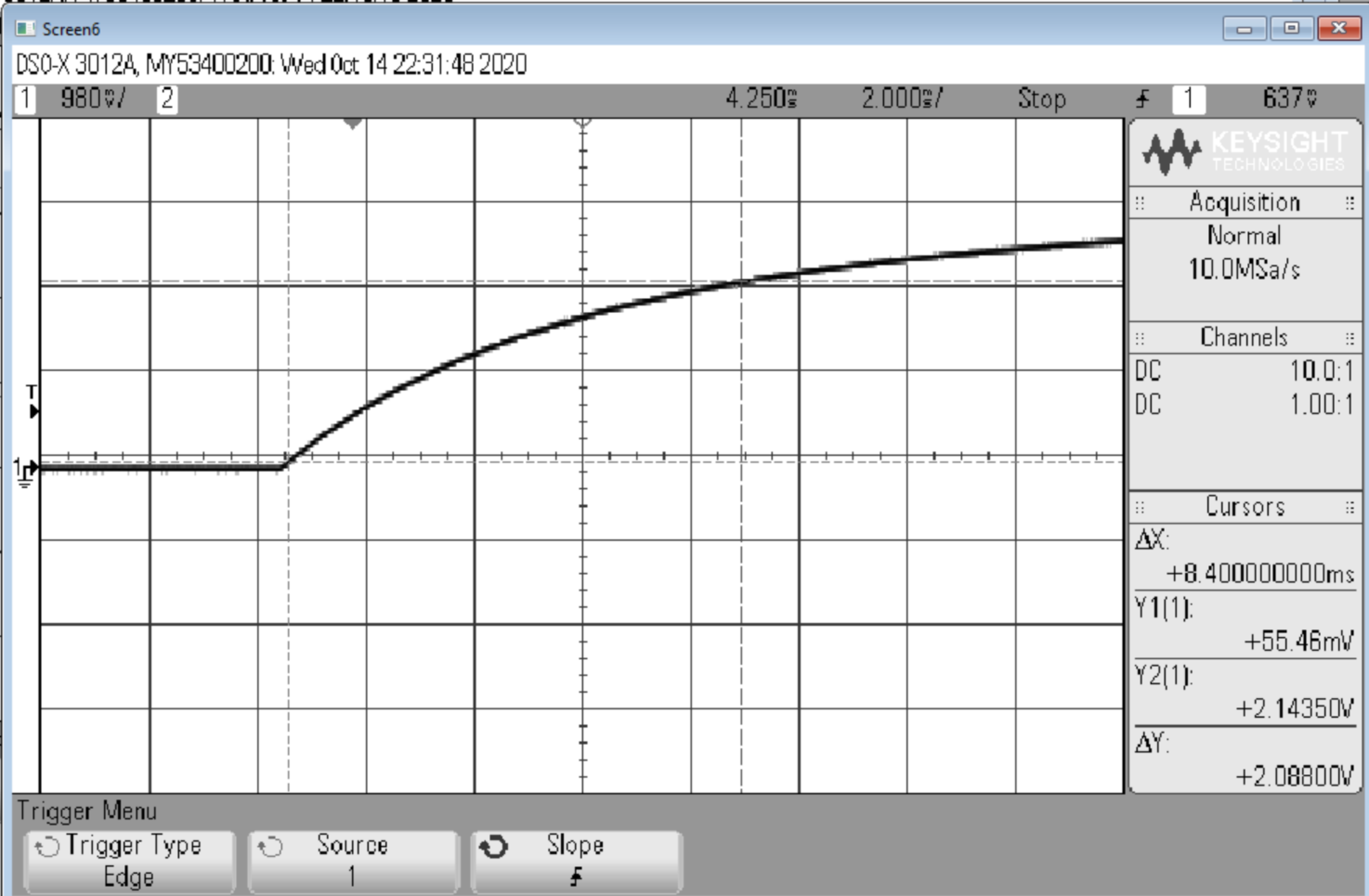
_____ > _____

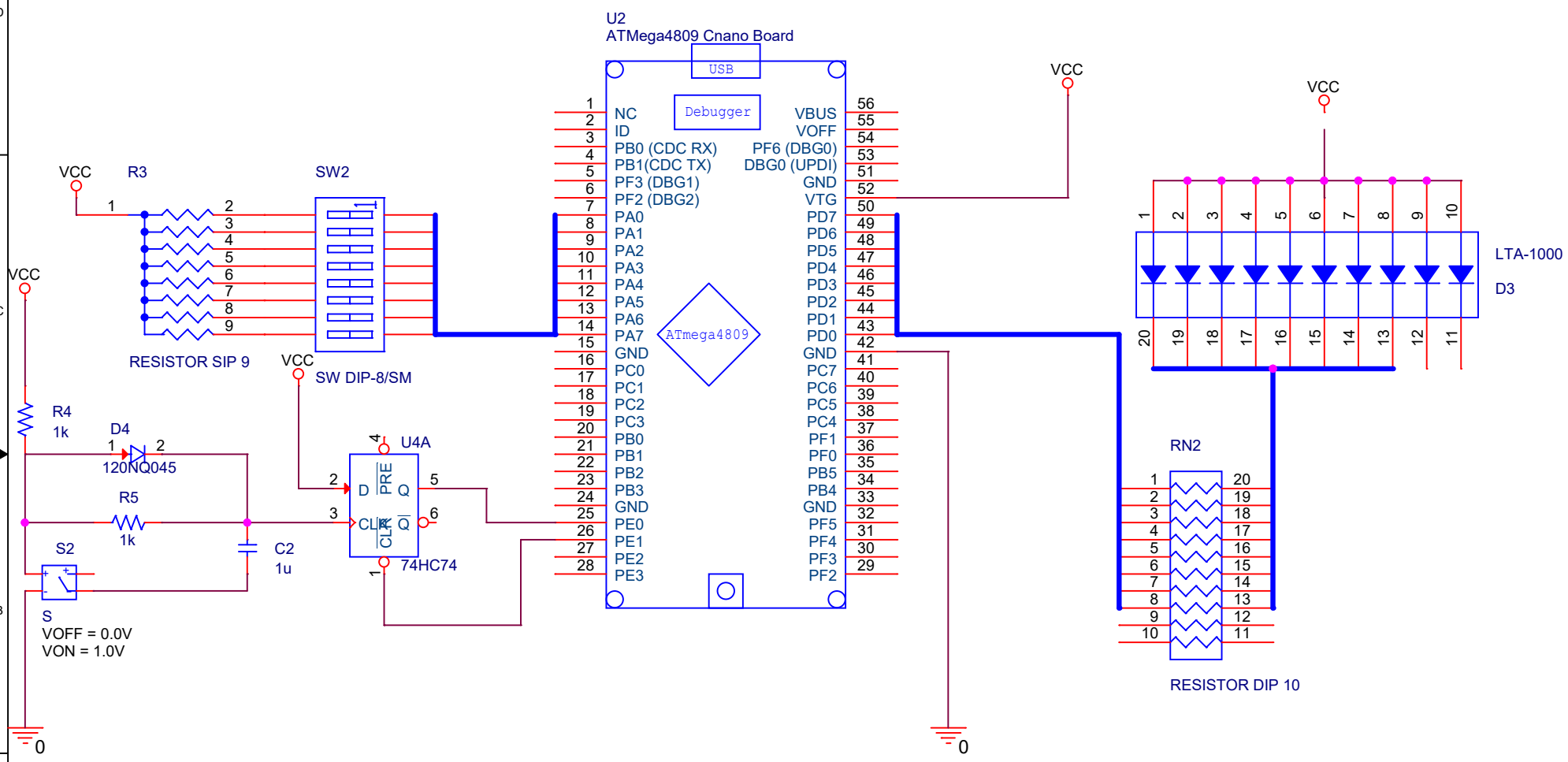
$I_{ILmax(A)} < I_{OLmax(B)}$

_____ < _____


Screen3
DSO-X 3012A, MY53400200: Wed Oct 14 22:08:07 2020
1 980mV/ 2
57.60ms 20.00ms/ Stop
1 637mV
KEYSIGHT TECHNOLOGIES
Acquisition
Normal
4.00MSa/s
Channels
DC 10.0:1
DC 1.00:1
Cursors
ΔX:
+157.800000000ms
Y1(1):
+3.24661V
Y2(1):
+3.20721V
ΔY:
-39.50mV
Cursors Menu
Mode
Track
X1 Source
1
X2 Source
1
Cursors
X2
Units
X1: -16.4000000ms
X2: 141.40000ms


Screen7
DSO-X 3012A, MY53400200: Wed Oct 14 22:33:40 2020
1 980mV/ 2
-3.750ms 3.600ms/ Stop
1 637mV
KEYSIGHT TECHNOLOGIES
Acquisition
Normal
20.0MSa/s
Channels
DC 10.0:1
DC 1.00:1
Cursors
ΔX:
+10.400000000ms
Y1(1):
+3.24661V
Y2(1):
+1.15857V
ΔY:
-2.08800V
Trigger Menu
Trigger Type
Edge
Source
1
Slope


Screen6
DSO-X 3012A, MY53400200: Wed Oct 14 22:31:48 2020
1 980mV/ 2
4.250ms 2.000ms/ Stop
1 637mV
KEYSIGHT TECHNOLOGIES
Acquisition
Normal
10.0MSa/s
Channels
DC 10.0:1
DC 1.00:1
Cursors
ΔX:
+8.400000000ms
Y1(1):
+55.46mV
Y2(1):
+2.14350V
ΔY:
+2.08800V
Trigger Menu
Trigger Type
Edge
Source
1
Slope



Title	<Title>	
Size A	Document Number <Doc>	Rev <RevCo
Date: Tuesday, October 13, 2020	Sheet 1 of 1	

```
1
2  AVRASM ver. 2.2.7  E:\ESE_280\$MyDocuments$\Atmel Studio\7.0\lab_6
     \conditional_input_hdwe\conditional_input_hdwe\main.asm Tue Oct 13 20:14:54
     2020
3
4  E:\ESE_280\$MyDocuments$\Atmel Studio\7.0\lab_6\conditional_input_hdwe
     \conditional_input_hdwe\main.asm(9): Including file 'C:/Program Files (x86)
     \Atmel\Studio\7.0\Packs\atmel\ATmega_DFP\1.3.300\avrasm\inc\m4809def.inc'
5  E:\ESE_280\$MyDocuments$\Atmel Studio\7.0\lab_6\conditional_input_hdwe
     \conditional_input_hdwe\main.asm(9): Including file 'C:/Program Files (x86)
     \Atmel\Studio\7.0\Packs\atmel\ATmega_DFP\1.3.300\avrasm\inc\m4809def.inc'
6
7
8                                  ; conditional_input_hdwe.asm
9                                  ;
10                                 ; Created: 10/6/2020 6:38:10 PM
11                                 ; Author : hp
12                                 ;
13
14                                 .list
15
16
17                                 ; Replace with your application code
18                                 start:
19 000000 e000                        ldi r16, $00
20 000001 ef1f                        ldi r17, $FF
21 000002 b900                         out VPORTA_DIR, r16
22 000003 b91c                        out VPORTD_DIR, r17
23 000004 b90d                        out VPORTD_OUT, r16
24 000005 9880                        cbi VPORTE_DIR, 0
25 000006 9a81                        sbi VPORTE_DIR, 1
26
27                                 check_flag:
28 000007 9a89                        sbi VPORTE_OUT, 1
29 000008 9990                        sbic VPORTE_IN, 0
30 000009 cffd                        rjmp check_flag
31
32                                 sw_led_io:
33 00000a b102                        in r16, VPORTA_IN
34 00000b 9500                        com r16
35 00000c b90d                        out VPORTD_OUT, r16
36 00000d 9889                        cbi VPORTE_OUT, 1
37
38
39 RESOURCE USE INFORMATION
40 ------------------------
41
42 Notice:
43 The register and instruction counts are symbol table hit counts,
```

```
and hence implicitly used resources are not counted, eg, the
'lpm' instruction without operands implicitly uses r0 and z,
none of which are counted.

x,y,z are separate entities in the symbol table and are
counted separately from r26..r31 here.

.dseg memory usage only counts static data declared with .byte

"ATmega4809" register use summary:
x  :   0 y  :   0 z  :   0 r0 :   0 r1 :   0 r2 :   0 r3 :   0 r4 :   0
r5 :   0 r6 :   0 r7 :   0 r8 :   0 r9 :   0 r10:   0 r11:   0 r12:   0
r13:   0 r14:   0 r15:   0 r16:   6 r17:   2 r18:   0 r19:   0 r20:   0
r21:   0 r22:   0 r23:   0 r24:   0 r25:   0 r26:   0 r27:   0 r28:   0
r29:   0 r30:   0 r31:   0
Registers used: 2 out of 35 (5.7%)

"ATmega4809" instruction use summary:
.lds  :   0 .sts  :   0 adc   :   0 add   :   0 adiw  :   0 and   :   0
andi  :   0 asr   :   0 bclr  :   0 bld   :   0 brbc  :   0 brbs  :   0
brcc  :   0 brcs  :   0 break :   0 breq  :   0 brge  :   0 brhc  :   0
brhs  :   0 brid  :   0 brie  :   0 brlo  :   0 brlt  :   0 brmi  :   0
brne  :   0 brpl  :   0 brsh  :   0 brtc  :   0 brts  :   0 brvc  :   0
brvs  :   0 bset  :   0 bst   :   0 call  :   0 cbi   :   2 cbr   :   0
clc   :   0 clh   :   0 cli   :   0 cln   :   0 clr   :   0 cls   :   0
clt   :   0 clv   :   0 clz   :   0 com   :   1 cp    :   0 cpc   :   0
cpi   :   0 cpse  :   0 dec   :   0 des   :   0 eor   :   0 fmul  :   0
fmuls :   0 fmulsu:   0 icall :   0 ijmp  :   0 in    :   1 inc   :   0
jmp   :   0 ld    :   0 ldd   :   0 ldi   :   2 lds   :   0 lpm   :   0
lsl   :   0 lsr   :   0 mov   :   0 movw  :   0 mul   :   0 muls  :   0
mulsu :   0 neg   :   0 nop   :   0 or    :   0 ori   :   0 out   :   4
pop   :   0 push  :   0 rcall :   0 ret   :   0 reti  :   0 rjmp  :   2
rol   :   0 ror   :   0 sbc   :   0 sbci  :   0 sbi   :   2 sbic  :   1
sbis  :   0 sbiw  :   0 sbr   :   0 sbrc  :   0 sbrs  :   0 sec   :   0
seh   :   0 sei   :   0 sen   :   0 ser   :   0 ses   :   0 set   :   0
sev   :   0 sez   :   0 sleep :   0 spm   :   0 st    :   0 std   :   0
sts   :   0 sub   :   0 subi  :   0 swap  :   0 tst   :   0 wdr   :   0

Instructions used: 8 out of 114 (7.0%)

"ATmega4809" memory use summary [bytes]:
Segment   Begin    End      Code   Data   Used    Size   Use%
----------------------------------------------------------------
[.cseg] 0x000000 0x00001e     30      0     30   49152   0.1%
[.dseg] 0x002800 0x002800      0      0      0    6144   0.0%
[.eseg] 0x000000 0x000000      0      0      0     256   0.0%

Assembly complete, 0 errors, 0 warnings

```