Comment	Description	Designator	Footprint	LibRef	Quantity
LED_Y		D1	D_0603_LED_Y	LED_Y	1
LED_G		D2	D_0603_LED_G	LED_G	1
LED_O		D3	D_0603_LED_O	LED_O	1
LED_R		D4, D5, D6, D7, D8, D9, D10, D11, D12	D_0603_LED_R	LED_R	9
Header 20X2	Header, 20-Pin, Dual row	P1	Header 40p 2x20 hole F, fem Draw	Header 20X2	1
0	Resistor	R1, R2, R4, R5, R8, R9	R_0603-thin	Res2	6
1K	Resistor	R3	R_0603-thin	Res2	1
56	ResNet x4	R6, R7	RESNETX4_0603_3216 M	Rx4_0603_3216M	2
4.7k	Resistor	R10, R11, R12, R13, R14, R15, R17, R19, R21	R_0603	Res2	9
1k	Resistor	R16, R20, R22	R_0603	Res2	3
560	Resistor	R18	R_0603	Res2	1
1k	ResNet x4	R23, R25	ResNetx4_0603_3216M	Rx4_0603_3216M	2
330	ResNet x4	R24, R26, R27, R28	ResNetx4_0603_3216M	Rx4_0603_3216M	4
100	Resistor	R29, R30, R31, R32, R33, R34	R_0603-thin	Res2	6
SKQUDBE010	SKQUDBE010-ALPS	S1	SKQUDBE010	Joystick_5P	1
PushButton1_4p	[NoValue], [NoValue], [NoValue], PushButton	S2, S3, S4, S5	FSM4JSMA	PushButton1_4p	4
Switch8p_On_Tri_On		S6	SOP254P990X265-16N	Switch8p_On_Tri_On	1
pMOS		T1, T2, T3, T4, T5, T6	SSSMINI3-F2-B	pMOS	6
nMOS		T7, T8, T9, T10, T11, T12, T13, T14, T15, T16, T17, T18, T19, T20	SSSMINI3-F2-B	nMOS	14
TP		TP1, TP2	TP_0.75mm	TP	2
7SEG_6Digit_KEM-3061-ASR		U1	7SEG_6DIGI_7.68MM	7SEG_6Digit_KEM-3061-ASR	1
7SEG_4Digit_LTC4627JR	7SEG 4DIGI Annode Com	U2	7SEG_4DIGI_10MM_LTC	7SEG_4Digit_LTC4627JR	1
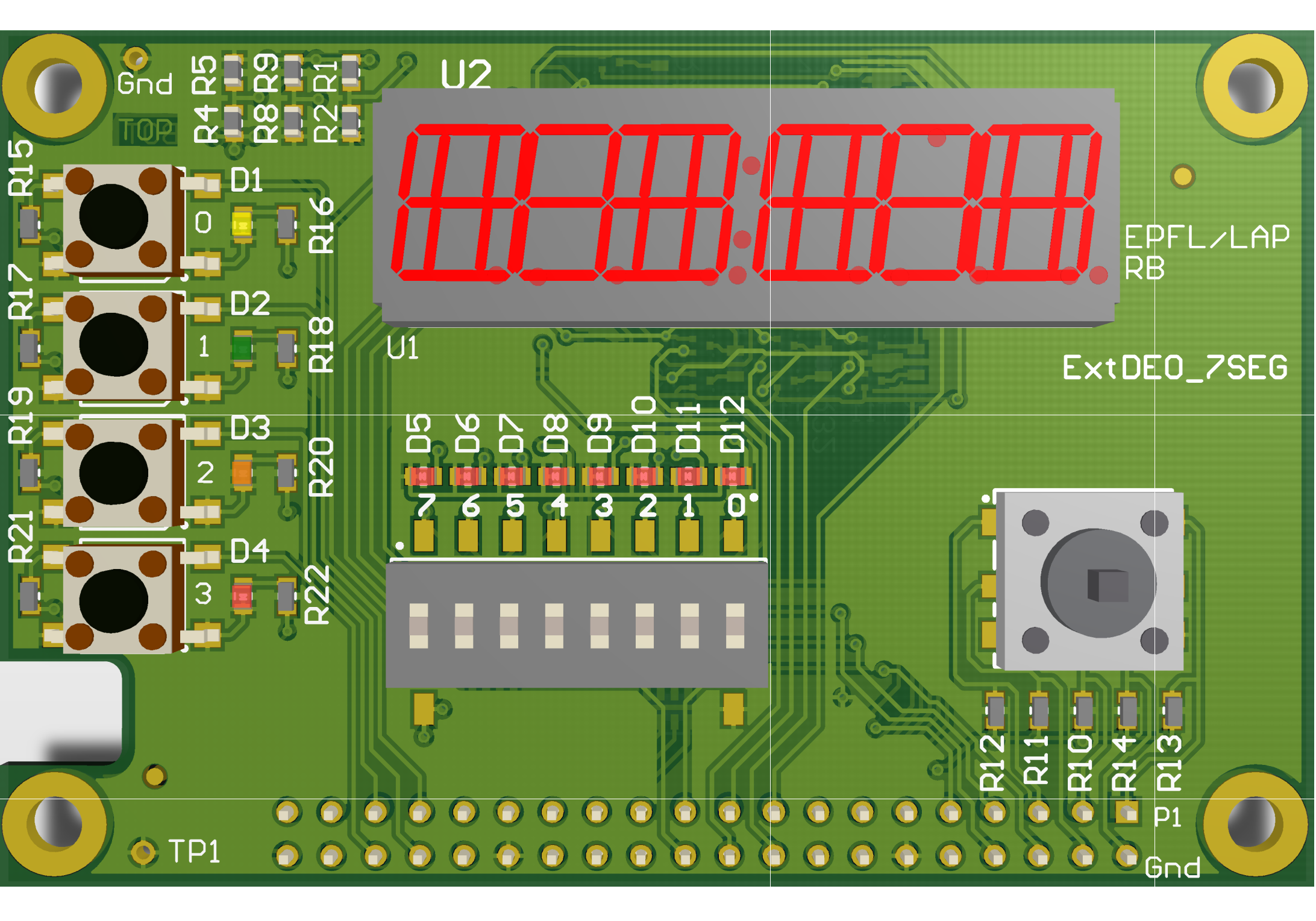
Gnd

TOP

R4 R5
R8 R9
R2 R1

R15
R17
R19
R21

D1
0

D2
1

D3
2

D4
3

R16

R18

R20

R22

U2

U1

D5 D6 D7 D8 D9 D10 D11 D12

7 6 5 4 3 2 1 0

EPFL/LAP
RB

ExtDEO_7SEG

R12 R11 R10 R14 R13

P1

TP1

Gnd

TP1
TP2
GND

U_ExtDE0_7Seg_Connectors
ExtDE0_7Seg_Connectors.SchDoc

U_ExtDE0_7Seg_Joystick
ExtDE0_7Seg_Joystick.SchDoc

nJoystickW
nJoystickS
nJoystickE
nJoystickN
nJoystickC

nJoystickW
nJoystickS
nJoystickE
nJoystickN
nJoystickC

nJoystickW
nJoystickS
nJoystickE
nJoystickN
nJoystickC

Sw_Led0_[7..0]

U_ExtDE0_7Seg_Sw_LEDs
ExtDE0_7Seg_Sw_LEDs.SchDoc

Sw_Led0_[7..0]

Sw_Led0_[7..0]

U_ExtDE0_7Seg_6Dig7Seg
ExtDE0_7Seg_6Dig7Seg.SchDoc

Reset_Led
nSelDig_[5..0]

SelSeg[7..0]

Reset_Led
nSelDig_[5..0]

SelSeg[7..0]

Reset_Led
nSelDig_[5..0]

SelSeg[7..0]

LedButton[3..0]

nButton[3..0]

U_ExtDE0_7Seg_LED_Buttons
ExtDE0_7Seg_LED_Buttons.SchDoc

LedButton[3..0]

nButton[3..0]

LedButton[3..0]

nButton[3..0]

V1
Support3mm

V2
Support3mm

V3
Support3mm
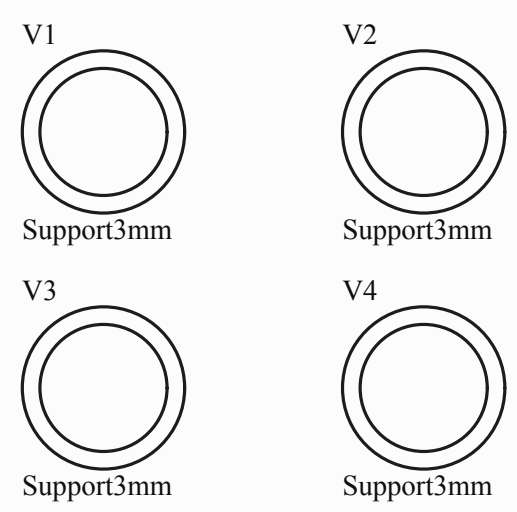
V4
Support3mm

M1
Marker_circle
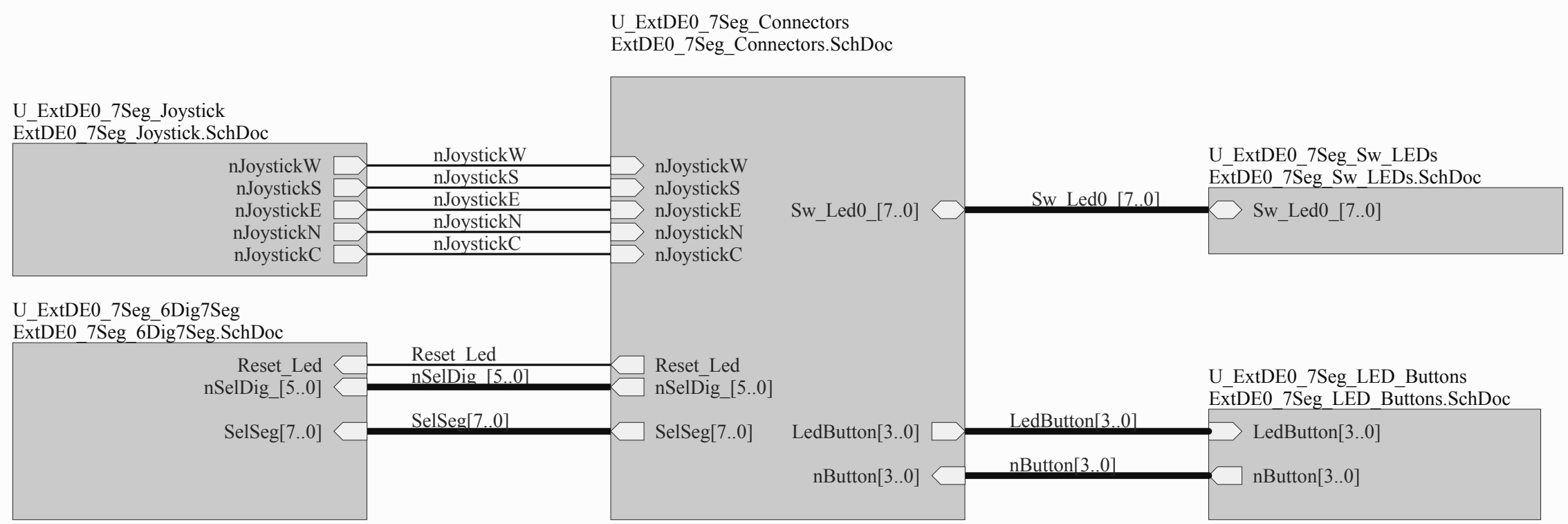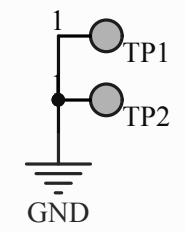
M2
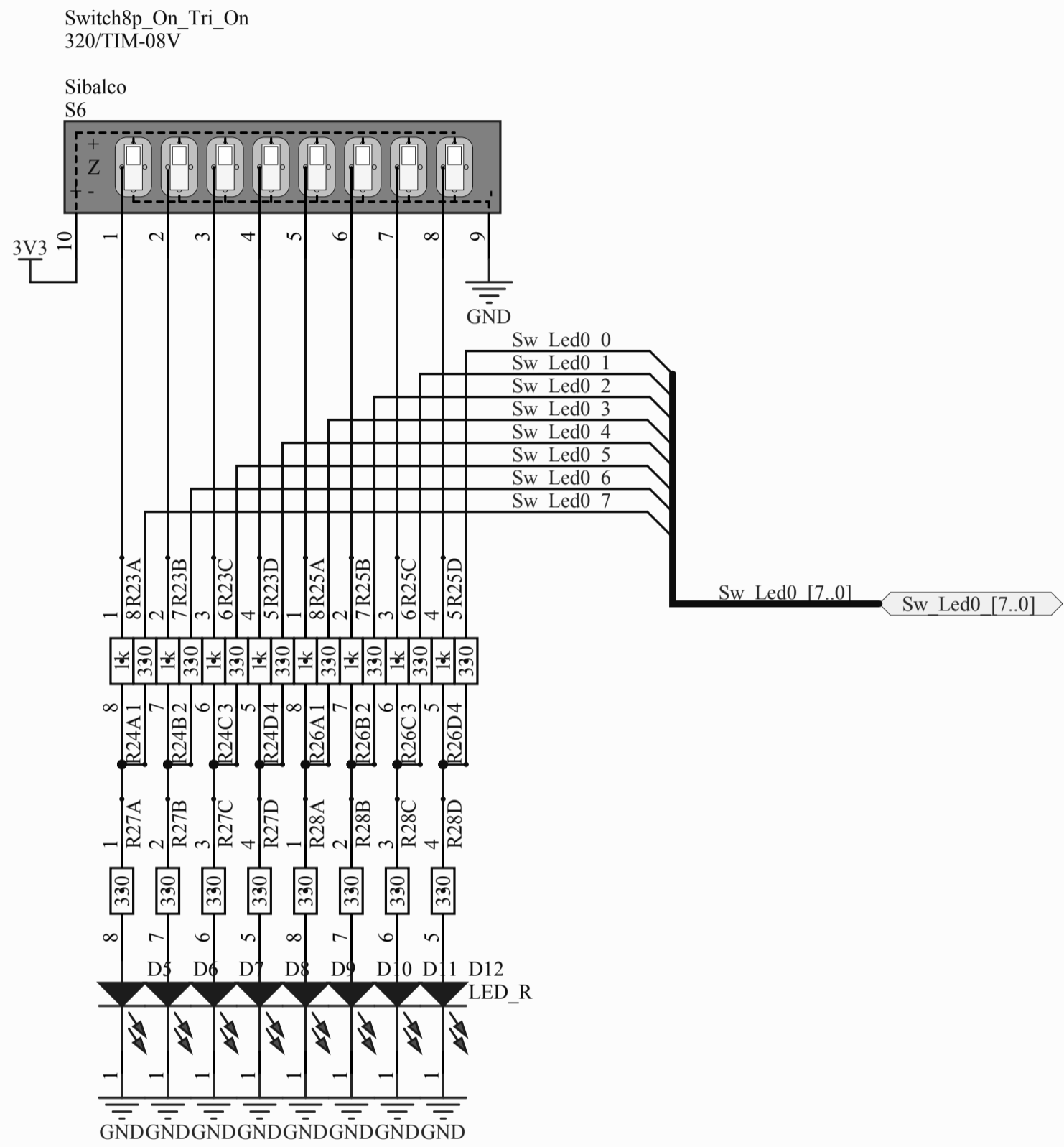Marker_Circle

M3
Marker_Circle

M4
Marker_Circle

Title **Extension DE0 7Seg, LED, Switches & others**

EPFL / LAP
R.Beuchat
*
*
*

Size: A4 | Number:* | Revision:A

Date: 16.01.2013 | Time: 18:51:21 | Sheet1 of 6

File: C:\Beuchat_local\Dropbox\Developpements\DE0Ext_7Seg\Altium_ExtDE0_7Seg\ExtDE0_7Seg_top.SchDoc

lap | EPFL
ÉCOLE POLYTECHNIQUE
FÉDÉRALE DE LAUSANNE

Switch8p_On_Tri_On
320/TIM-08V

Sibalco
S6

3V3

GND

Sw_Led0_0
Sw_Led0_1
Sw_Led0_2
Sw_Led0_3
Sw_Led0_4
Sw_Led0_5
Sw_Led0_6
Sw_Led0_7

Sw_Led0_[7..0]

Sw_Led0_[7..0]

R23A 1k   R23B 1k   R23C 1k   R23D 1k   R25A 1k   R25B 1k   R25C 1k   R25D 1k
330   330   330   330   330   330   330   330

R24A   R24B   R24C   R24D   R26A   R26B   R26C   R26D

R27A   R27B   R27C   R27D   R28A   R28B   R28C   R28D
330   330   330   330   330   330   330   330

D5 D6 D7 D8 D9 D10 D11 D12
LED_R

GND GND GND GND GND GND GND GND

3V3

R15
4.7K

nButton0

S2
4   3
2   1

PushButton1_4p
506-FSM4JSMATR

GND

LedButton0

R16
1K

D1
LED_Y

GND

3V3

R17
4.7K

nButton1

S3
4   3
2   1

PushButton1_4p
506-FSM4JSMATR

GND

LedButton1

R18
560

D2
LED_G

GND

3V3

R19
4.7K

nButton2

S4
4   3
2   1

PushButton1_4p
506-FSM4JSMATR

GND

LedButton2

R20
1K

D3
LED_O

GND

3V3

R21
4.7K

nButton3

S5
4   3
2   1

PushButton1_4p
506-FSM4JSMATR

GND

LedButton3

R22
1K

D4
LED_R

GND

LedButton[3..0]   LedButton[3..0]

nButton[3..0]   nButton[3..0]

nSelDig_[5..0]

SelSeg[7..0]

Reset_Led

Reset_Led

3V3
R1
0
R2
0
GND

pMOS
T1 T2 T3 T4 T5 T6
nSelDig_5 nSelDig_4 nSelDig_3 nSelDig_2 nSelDig_1 nSelDig_0

Dig0
Dig1
Dig2
Dig3
Dig4
Dig5

R29 100 R30 100 R31 100 R32 100 R33 100 R34 100

T7 T8 T9 T10 T11 T12

R3 1K 1K
GND

3V3 R4 0
GND
R5 0

U1
7SEG_6Digit_KEM-3061-ASR
DIG5(Dig1) DIG4(Dig2) DIG3(Dig3) DIG2(Dig4) DIG1(Dig5) DIG0(Dig6)
A B C D E F G DP

U2
7SEG_4Digit_LTC4627JR
LTC4627JR
DIG3(Dig1) DIG2(Dig2) DIG1(Dig3) DIG0(Dig4) L
A B C D E F G DP
nc 9
np 10
DPnp 12

SelSeg0 T13 nMOS   8 [56] 1 R6A   nA
ResNetx4_0603
SelSeg1 T14 nMOS   7 [56] 2 R6B   nB
SelSeg2 T15 nMOS   6 [56] 3 R6C   nC
SelSeg3 T16 nMOS   5 [56] 4 R6D   nD
SelSeg4 T17 nMOS   5 [56] 4 R7D   nE
SelSeg5 T18 nMOS   6 [56] 3 R7C   nF
SelSeg6 T19 nMOS   7 [56] 2 R7B   nG
SelSeg7 T20 nMOS   8 [56] 1 R7A   nDP

3V3 R8 0
R9 0
GND

Attention:

6 digits use multiplexed A, B, C, D, E, F, G, DP segments

A Reset transistor is added on each Digit selection to not have a problem of capacitor
load and bad led ligthning

IT MUSST NOT be activated at the same time as the Digit selection !

As we could have Cathode or Anaode common for the DIGIT, nMos or pMOS
transistor have to be mounted corectly
The Reset are nMOS Tr --> Active high

The column selection is with pMOS Tr --> active low

The segment selection is with nMOS --> active high

All the Digits transistors have to be activated one at a time.
With the selected digit, the Segment to highlith have to be activated

As the 6 digits are not yet available (2013/1/13), a 4 digit version is put in parallel

A reset has to be done between each digit access.

Title: Extension DE0 LED, Switches & others
EPFL/LAP
R.Beuchat
Size: A3   Number: *   Revision: B.1
Date: 16.01.2013   Time: 18:51:21   Sheet 4 of 6
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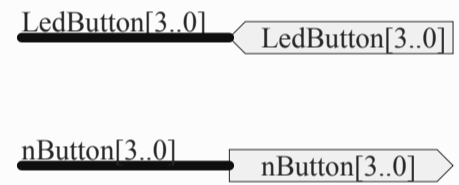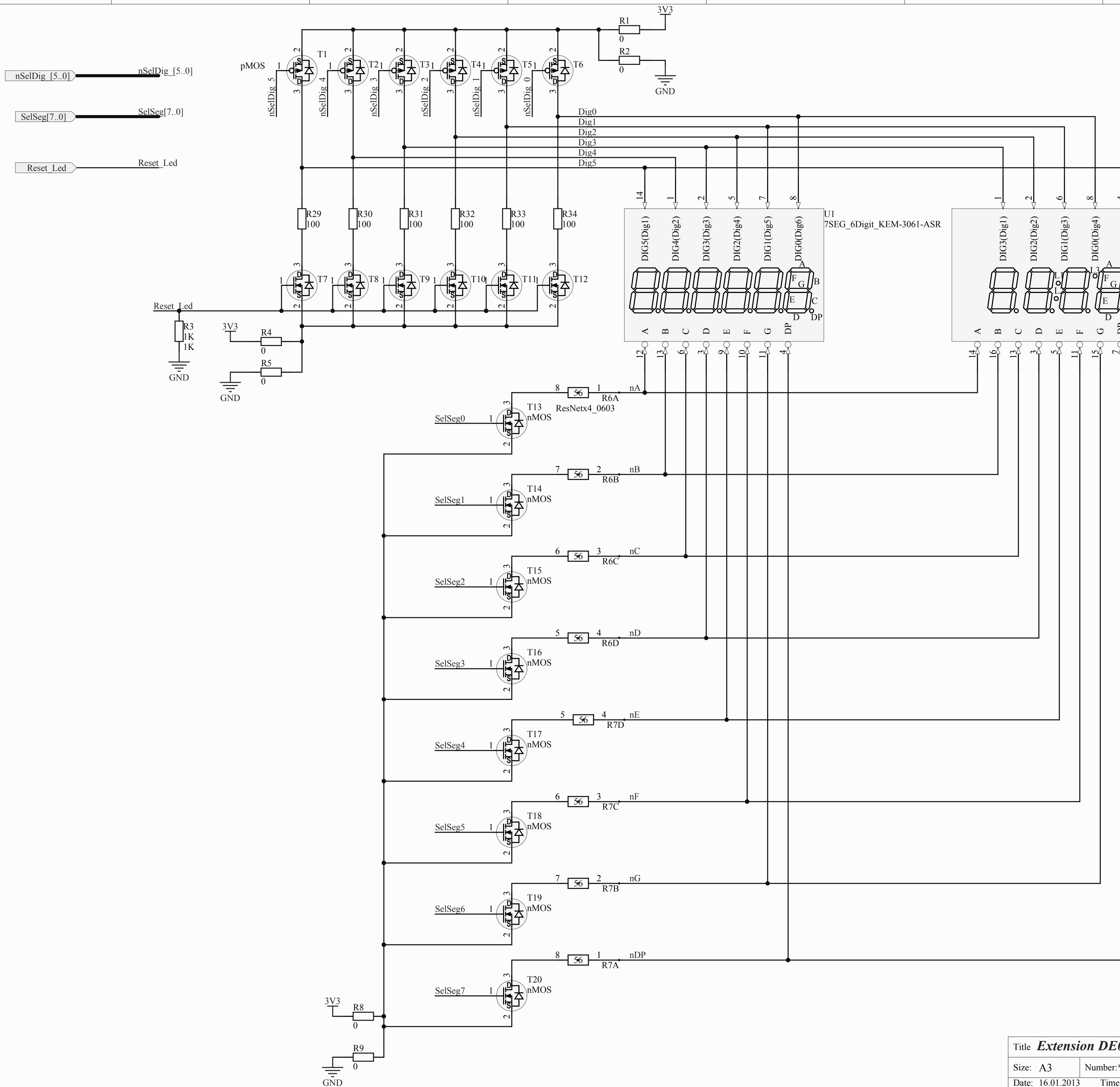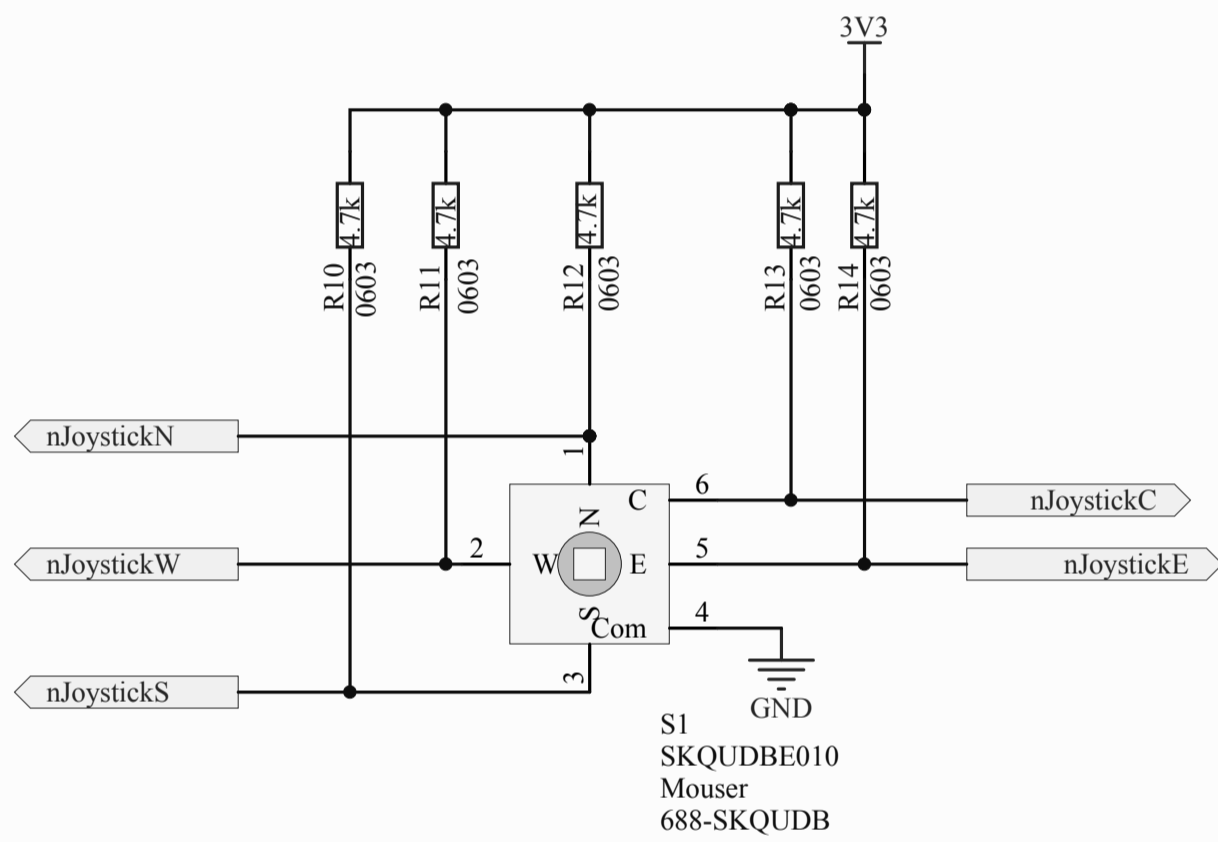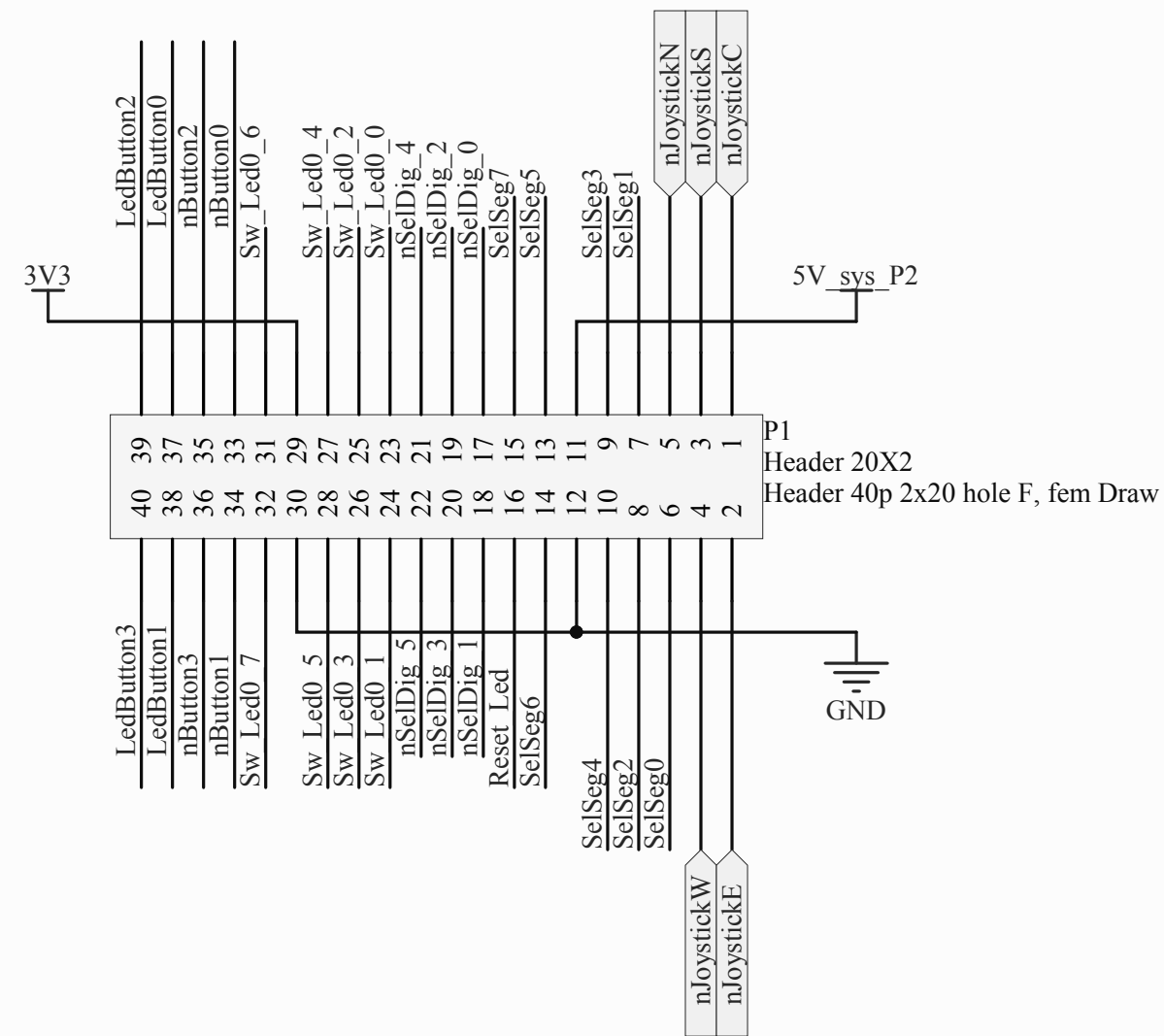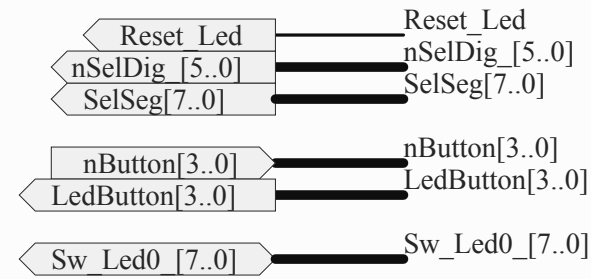
3V3

R10 4.7k 0603
R11 4.7k 0603
R12 4.7k 0603
R13 4.7k 0603
R14 4.7k 0603

nJoystickN — 1

nJoystickW — 2

nJoystickS — 3

C 6 — nJoystickC
E 5 — nJoystickE
N
W □ E
S
Com 4

GND

S1
SKQUDBE010
Mouser
688-SKQUDB

Correction of joystick pinning, RB 2012/08/28
R 4.7k
Correction Joystick PinName EW --> WE, RB
2012/9/25

Title **Extension DE0 LED, Switches & others**

LAP/EPFL
R.Beuchat

Size: A4	Number:*	Revision:B	
Date: 16.01.2013	Time: 18:51:21	Sheet 5 of 6	*Joystick*
File: C:\Beuchat_local\Dropbox\Developpements\DE0Ext_7Seg\Altium_ExtDE0_7Seg\ExtDE0_7Seg_Joystick.SchDoc			

LAP
EPFL
ÉCOLE POLYTECHNIQUE
FÉDÉRALE DE LAUSANNE

Reset_Led

nSelDig_[5..0]

SelSeg[7..0]

nButton[3..0]

LedButton[3..0]

Sw_Led0_[7..0]

Reset_Led
nSelDig_[5..0]
SelSeg[7..0]

nButton[3..0]
LedButton[3..0]

Sw_Led0_[7..0]

3V3

5V_sys_P2

P1
Header 20X2
Header 40p 2x20 hole F, fem Draw

GND

LedButton2
LedButton0
nButton2
nButton0
Sw_Led0_6
Sw_Led0_4
Sw_Led0_2
Sw_Led0_0
nSelDig_4
nSelDig_2
nSelDig_0
SelSeg7
SelSeg5
SelSeg3
SelSeg1
nJoystickN
nJoystickS
nJoystickC

LedButton3
LedButton1
nButton3
nButton1
Sw_Led0_7
Sw_Led0_5
Sw_Led0_3
Sw_Led0_1
nSelDig_5
nSelDig_3
nSelDig_1
Reset_Led
SelSeg6
SelSeg4
SelSeg2
SelSeg0
nJoystickW
nJoystickE

40 39
38 37
36 35
34 33
32 31
30 29
28 27
26 25
24 23
22 21
20 19
18 17
16 15
14 13
12 11
10 9
8 7
6 5
4 3
2 1