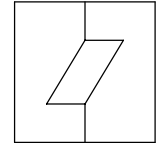


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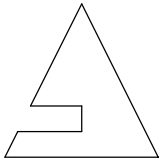
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HEB_LCD : HIGHER EDUCATIONAL BOARD, LCD MODULE

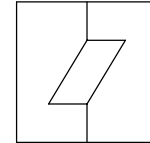
PAGE NO	PAGE NAME	DESCRIPTION	MOST IMPORTANT COMPONENTS
1	COVER	THIS PAGE	NO COMPONENT
2	VERSION	MODIFICATION SHEET WITH VERSION CONTROL	NO COMPONENT
3	INTERFACE	HEB POINT TO POINT INTERFACE	HEB POINT TO POINT CONNECTOR
4	POWER5V	LOW POWER DC/DC BOOST CONVERTER (5V - 100MA)	TPS61040 BOST CONVERTER
5	LCD	LCD BASED I2C + BACKLIGHT MANAGEMENT	LCD AND BACKLIGHT
6	SWITCH	SWITCH SUPPORT	4 SWITCHES
7	LED	LED SUPPORT	8 LEDS
8	RTC	RTC with forward watch clock	MAXIM DS1338

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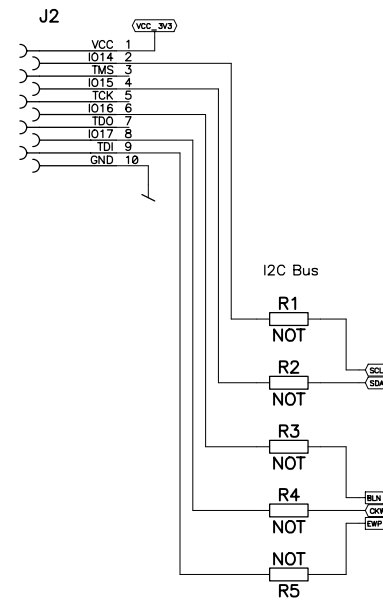
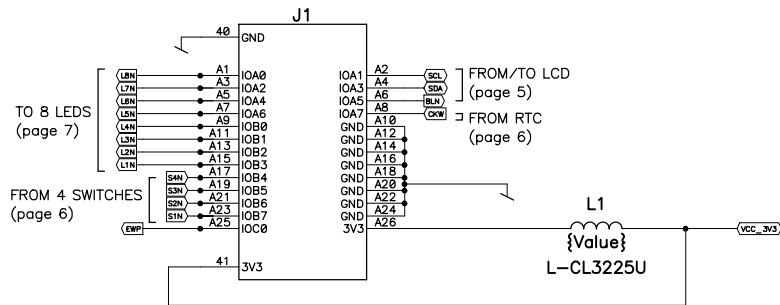
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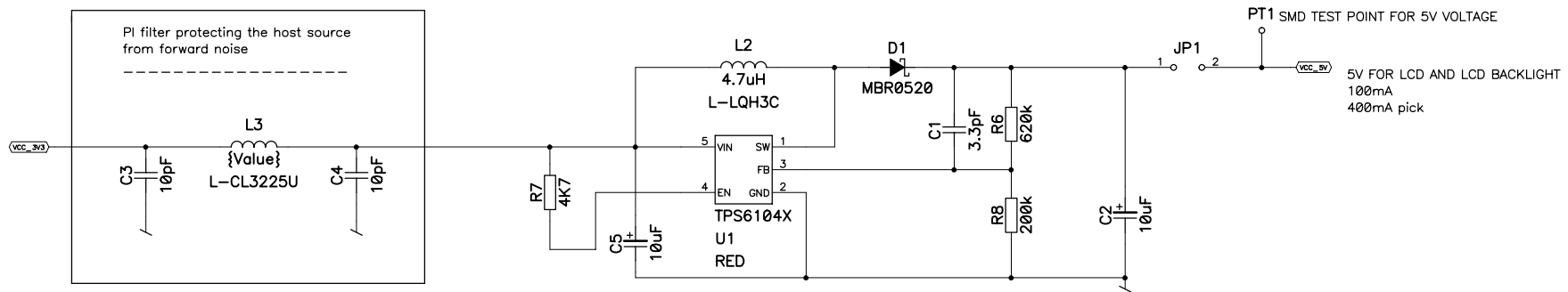
VERSION MANAGEMENT

DATE	VERSION	DESCRIPTION	AUTHOR
01 SEPT 2003	1.0	FIRST VERSION	GAUCH LAURENT

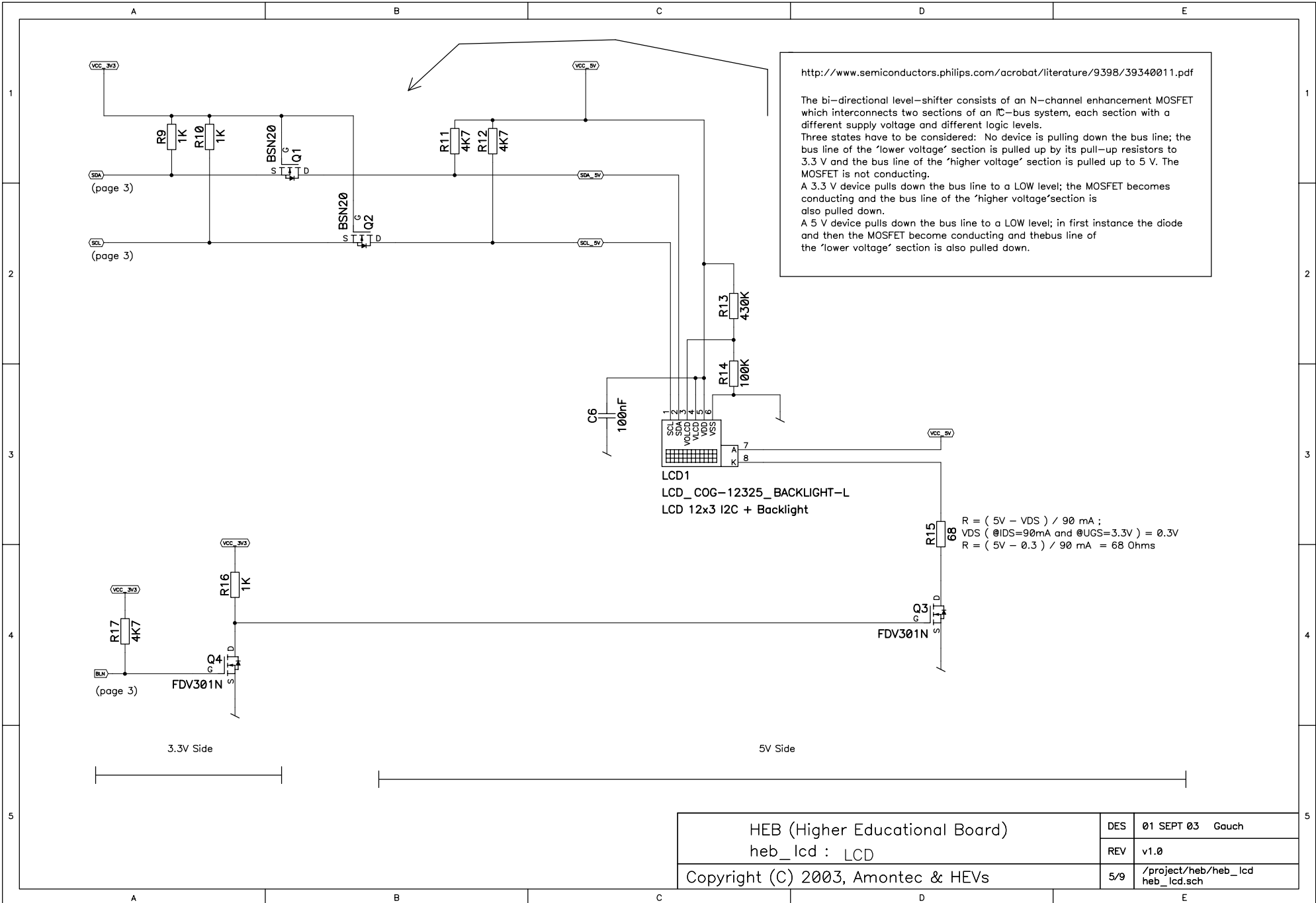
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<http://www.semiconductors.philips.com/acrobat/literature/9398/39340011.pdf>

The bi-directional level-shifter consists of an N-channel enhancement MOSFET which interconnects two sections of an I²C-bus system, each section with a different supply voltage and different logic levels.

Three states have to be considered: No device is pulling down the bus line; the bus line of the 'lower voltage' section is pulled up by its pull-up resistors to 3.3 V and the bus line of the 'higher voltage' section is pulled up to 5 V. The MOSFET is not conducting.

A 3.3 V device pulls down the bus line to a LOW level; the MOSFET becomes conducting and the bus line of the 'higher voltage' section is also pulled down.

A 5 V device pulls down the bus line to a LOW level; in first instance the diode and then the MOSFET become conducting and the bus line of the 'lower voltage' section is also pulled down.

$$R = (5V - V_{DS}) / 90 \text{ mA} ;$$

$$V_{DS} (@I_{DS}=90\text{mA and } @U_{GS}=3.3V) = 0.3V$$

$$R = (5V - 0.3) / 90 \text{ mA} = 68 \text{ Ohms}$$

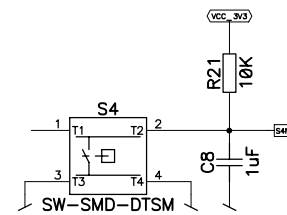
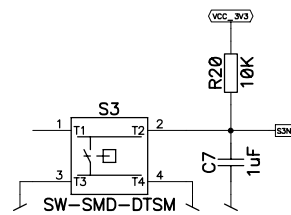
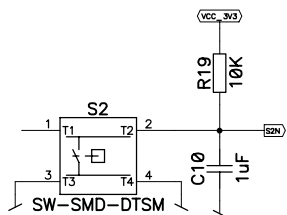
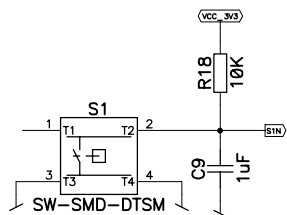
HEB (Higher Educational Board)
 heb_lcd : LCD
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When pushing the switch Sx, you will drive a '0' logic level on the SxN signal.

LxN LDx

 '1' 'OFF'
 '0' 'ON'



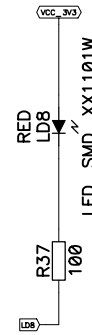
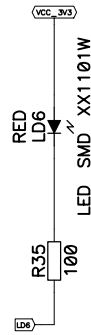
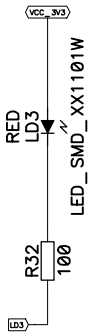
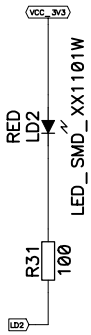
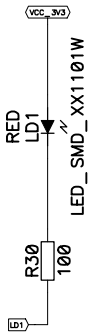
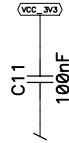
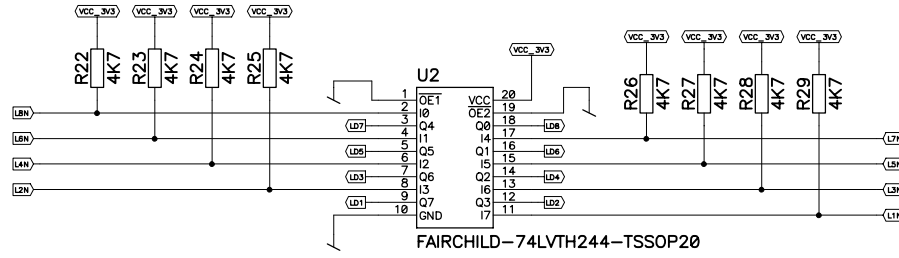
NOTE:

Capacitors are optional, they can be use for filtering the bounces on the switch
 $T = RC = 10K \times 1\mu F = 10ms$ anti-bouncing time

HEB (Higher Educational Board) heb_lcd : SWITCH	DES	01 SEPT 03 Gauch
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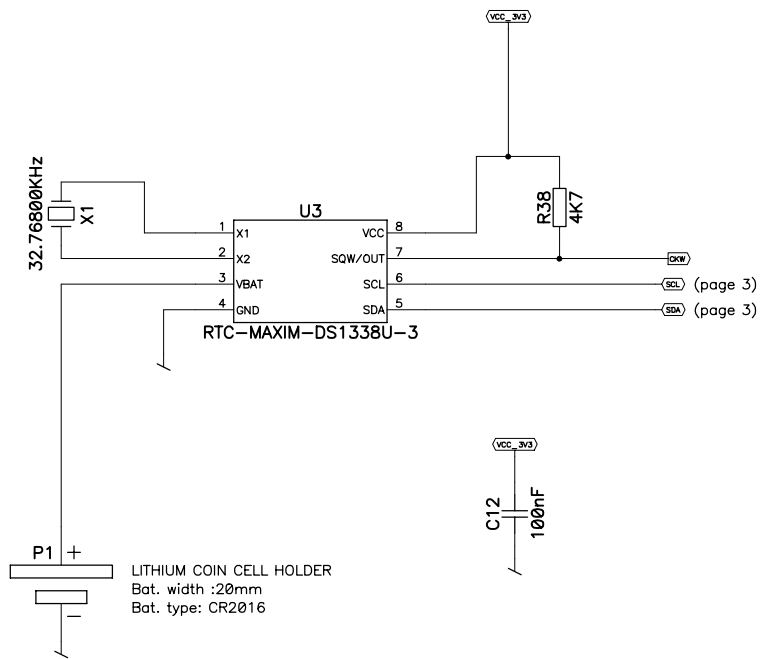
You have to drive a '0' logic on LxN signal to bring the LED LDx in a 'ON' state.
 LxN LDx

 '1' 'OFF'
 '0' 'ON'



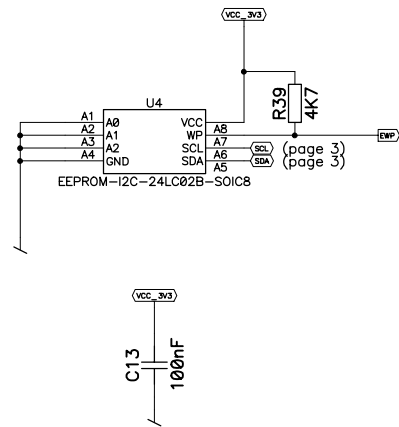
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