

8ENC - USERMANUAL

VERSION: 0.1

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Various repositories on GitHub under the username "novski"

The Manuals on vrlab.com/support

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1. 8 RGB Encoders with a eleven LED Ring

1.1. Functions

The 8Enc has eight Encoders with tactile Switch and each with a LED Ring around it.

Its trimmed to a minimum of distance between the Encoders and has a width of 220mm.

Its compatible with several different Modules from VLRLab as the 3x8But or the 8Disp PCB. Its driven by 4pin SPI compatible to Midibox **

1.1.1.Connections

Connect J1 to J8/9 of a Midibox Core with a 10 pin Ribon cable or if you use some else Controller like a Arduino or similar just connect the pins like this:

Pin 1&2 - Ground

Pin 3&4 - VCC +5V

Pin 5 - Serial Connection to the Controller - MISO

Pin 6 - Serial Connection from the Controller - MOSI

Pin 7&8 - Serial Clock -SC

Pin 9 - Slave Select - RC

1.1.2.Electrical specification

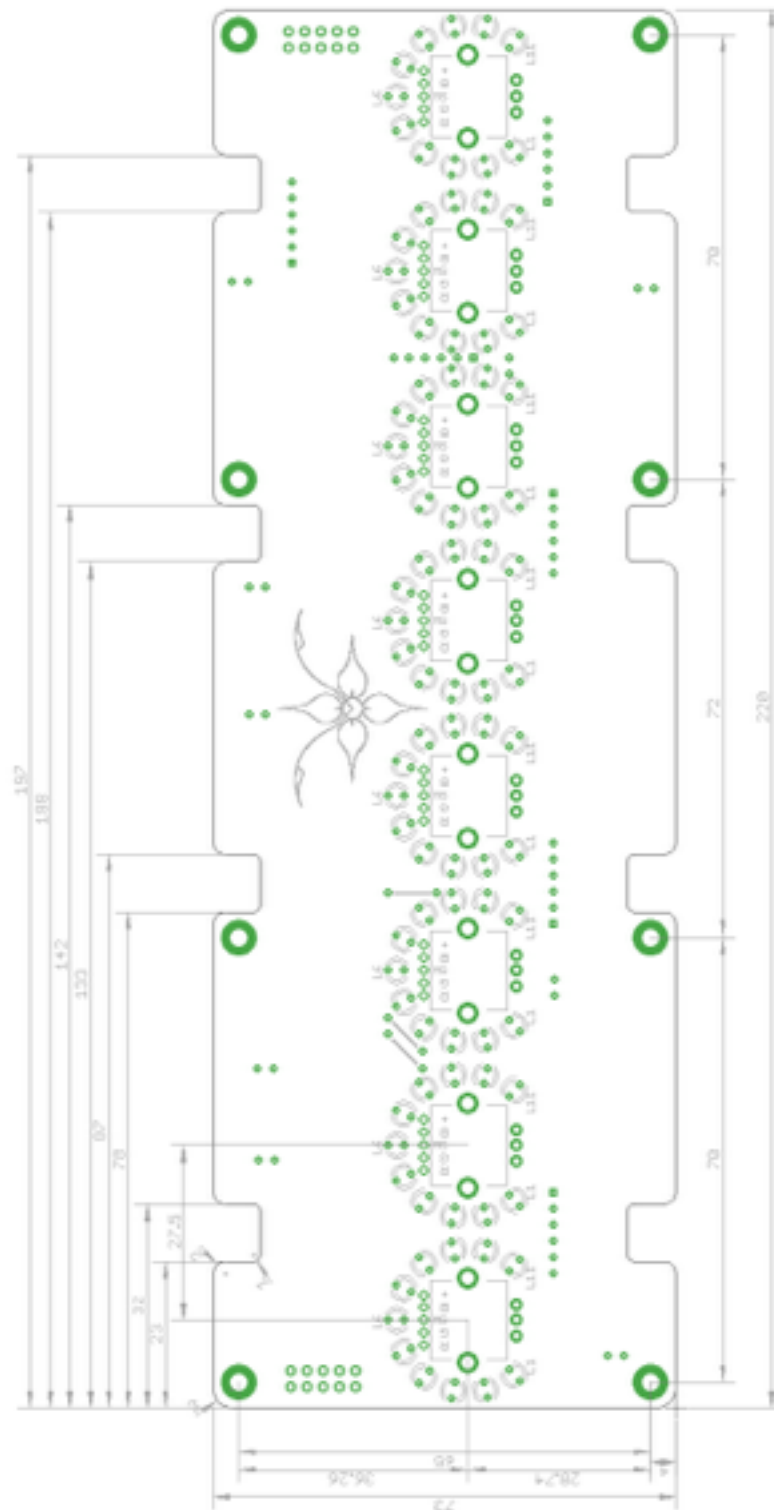
Supply Voltage: 5V

Power-consumption:

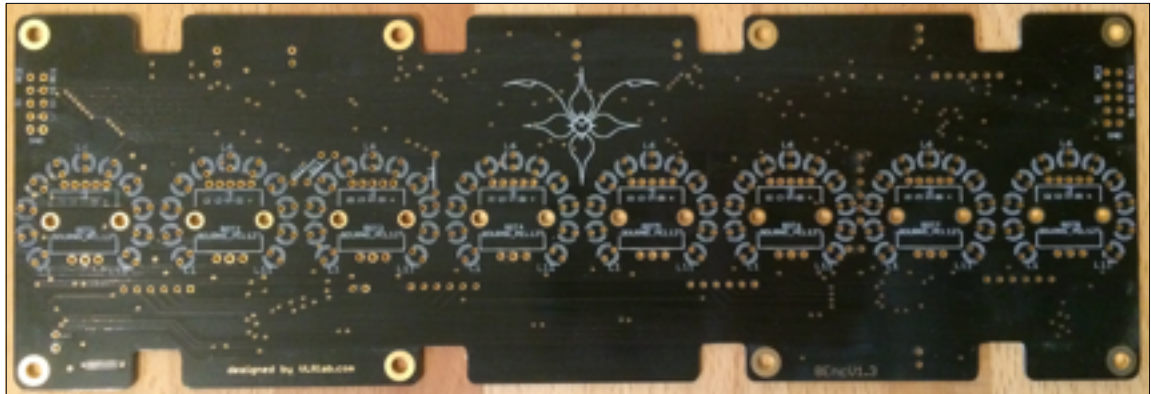
2. BOM

PART	VALUE	DEVICE	PACKAGE	LIBRARY	SHEET
DI_C1	100nF	C-EU025-024X044	C025-024X044	rcl	1
DI_C2	100nF	C-EU025-024X044	C025-024X044	rcl	1
DI_C3	100nF	C-EU025-024X044	C025-024X044	rcl	1
DI_IC1	74HC165N	74HC165NSO16D	SO16D	595-541-165-uln2803	1
DI_IC2	74HC165N	74HC165NSO16D	SO16D	595-541-165-uln2803	1
DI_IC3	74HC165N	74HC165NSO16D	SO16D	595-541-165-uln2803	1
DI_IC3B		ULN2803SO18W	SO18W	595-541-165-uln2803	1
DI_R1	10k	4306R	SIL6	Bourns Resistor Array	1
DI_R2	10k	4306R	SIL6	Bourns Resistor Array	1
DI_R3	10k	4306R	SIL6	Bourns Resistor Array	1
DI_R4	10k	4306R	SIL6	Bourns Resistor Array	1
DI_R5	10k	4306R	SIL6	Bourns Resistor Array	1
DI_R6	10k	4306R	SIL6	Bourns Resistor Array	1
DO_C4	100nF	C-EU025-024X044	C025-024X044	rcl	1
DO_C5	100nF	C-EU025-024X044	C025-024X044	rcl	1
DO_C6	100nF	C-EU025-024X044	C025-024X044	rcl	1
DO_C7	100n	C-EU025-024X044	C025-024X044	rcl	2
DO_C8	100n	C-EU025-024X044	C025-024X044	rcl	2
DO_C9	100n	C-EU025-024X044	C025-024X044	rcl	2
DO_IC4_R	TPIC6B595	TPIC6B595SO20W	SO20W	TPIC6B595	1
DO_IC5_G	TPIC6B595	TPIC6B595SO20W	SO20W	TPIC6B595	1
DO_IC6_B	TPIC6B595	TPIC6B595SO20W	SO20W	TPIC6B595	1
DO_IC7	74HC595	74HC595SO16D	SO16D	595-541-165-uln2803	2
DO_IC7B		ULN2803SO18W	SO18W	595-541-165-uln2803	2
DO_IC8	74HC595	74HC595SO16D	SO16D	595-541-165-uln2803	2
DO_IC9	74HC595	74HC595SO16D	SO16D	595-541-165-uln2803	2
DO_R5	220	4816P-1SOIC16W	SOIC16W	Bourns Resistor Array	1
DO_R6	220	4816P-1SOIC16W	SOIC16W	Bourns Resistor Array	1
DO_R7	220	4816P-1SOIC16W	SOIC16W	Bourns Resistor Array	1
J1		ML10	ML10	con-ml	1
J2		ML10	ML10	con-ml	1
MX_R10	220	4816P-1SOIC16W	SOIC16W	Bourns Resistor Array	2
R11	220	R-EU_0204/7	0204/7	rcl	2
R12	220	R-EU_0204/7	0204/7	rcl	2
R13	220	R-EU_0204/7	0204/7	rcl	2
ROT1	BOURNS_PEL	BOURNS_PEL12T	Including 11 LEDs	Bourns Encoder	1
ROT2	BOURNS_PEL	BOURNS_PEL12T	Including 11 LEDs	Bourns Encoder	1
ROT3	BOURNS_PEL	BOURNS_PEL12T	Including 11 LEDs	Bourns Encoder	1
ROT4	BOURNS_PEL	BOURNS_PEL12T	Including 11 LEDs	Bourns Encoder	1
ROT5	BOURNS_PEL	BOURNS_PEL12T	Including 11 LEDs	Bourns Encoder	1
ROT6	BOURNS_PEL	BOURNS_PEL12T	Including 11 LEDs	Bourns Encoder	1
ROT7	BOURNS_PEL	BOURNS_PEL12T	Including 11 LEDs	Bourns Encoder	1
ROT8	BOURNS_PEL	BOURNS_PEL12T	Including 11 LEDs	Bourns Encoder	1
LED Rizers	88 x 6MM				
LEDs	88 x LED				

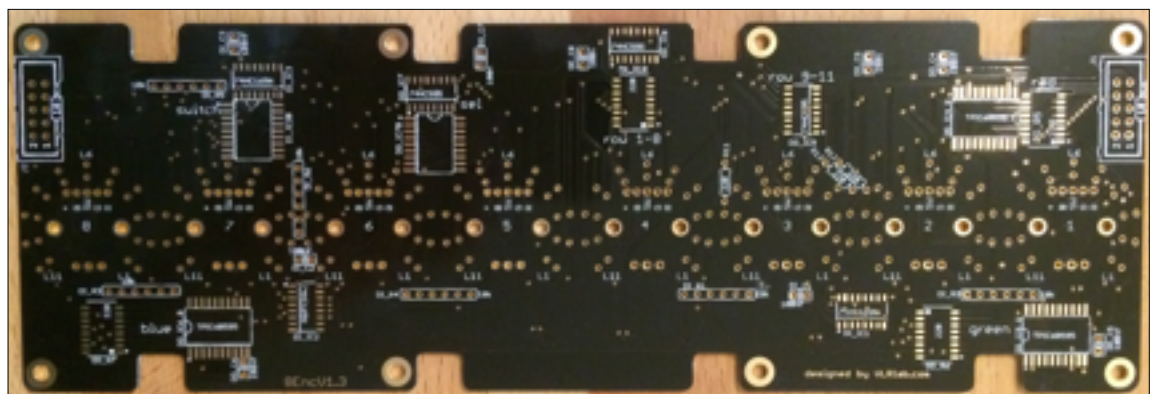
3. OUTLINES



3.1. FRONTVIEW



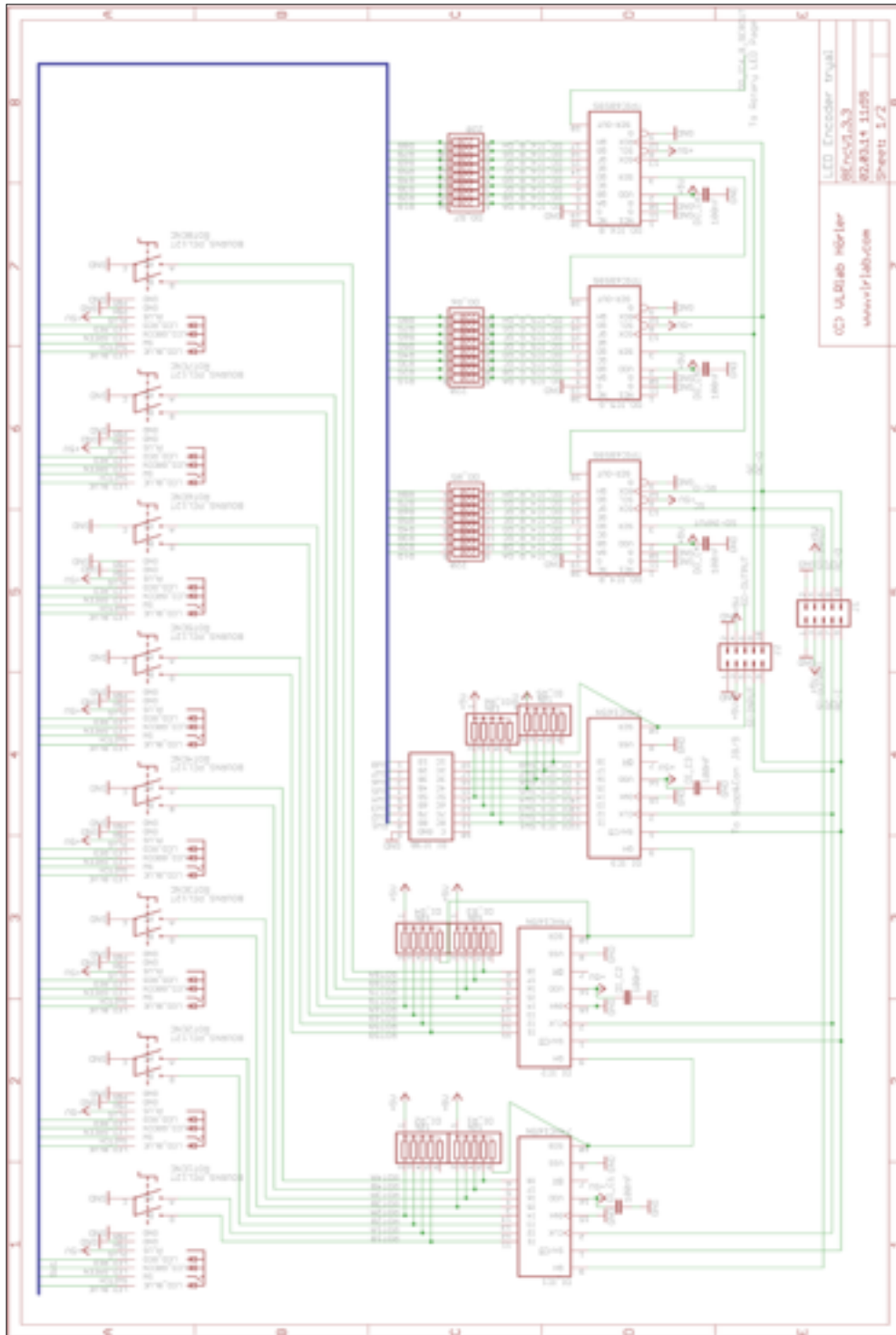
3.2. REARVIEW

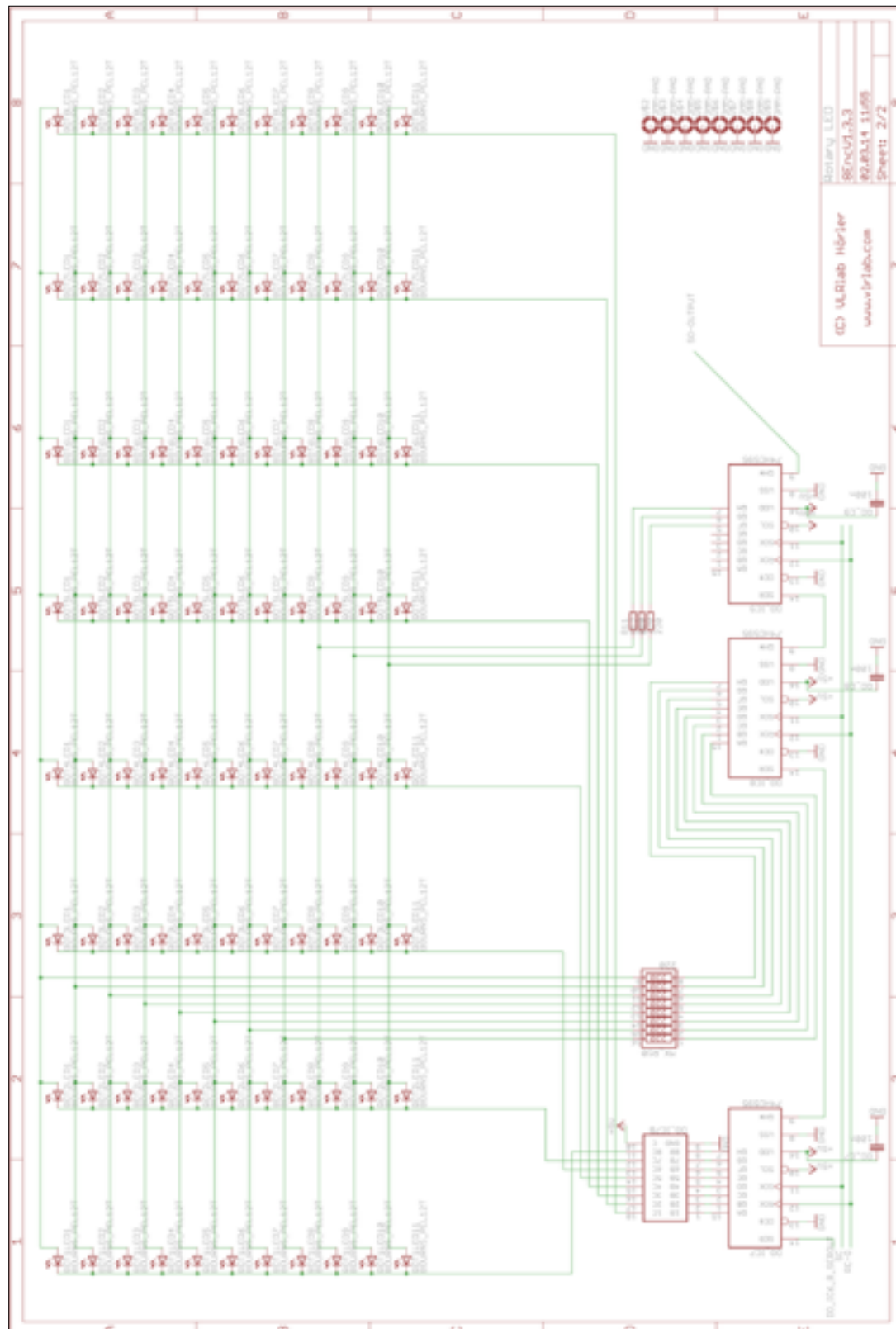


4. Schematics

The Schematics are downloadable over Github as well as everything of this Part. Here a short overview:

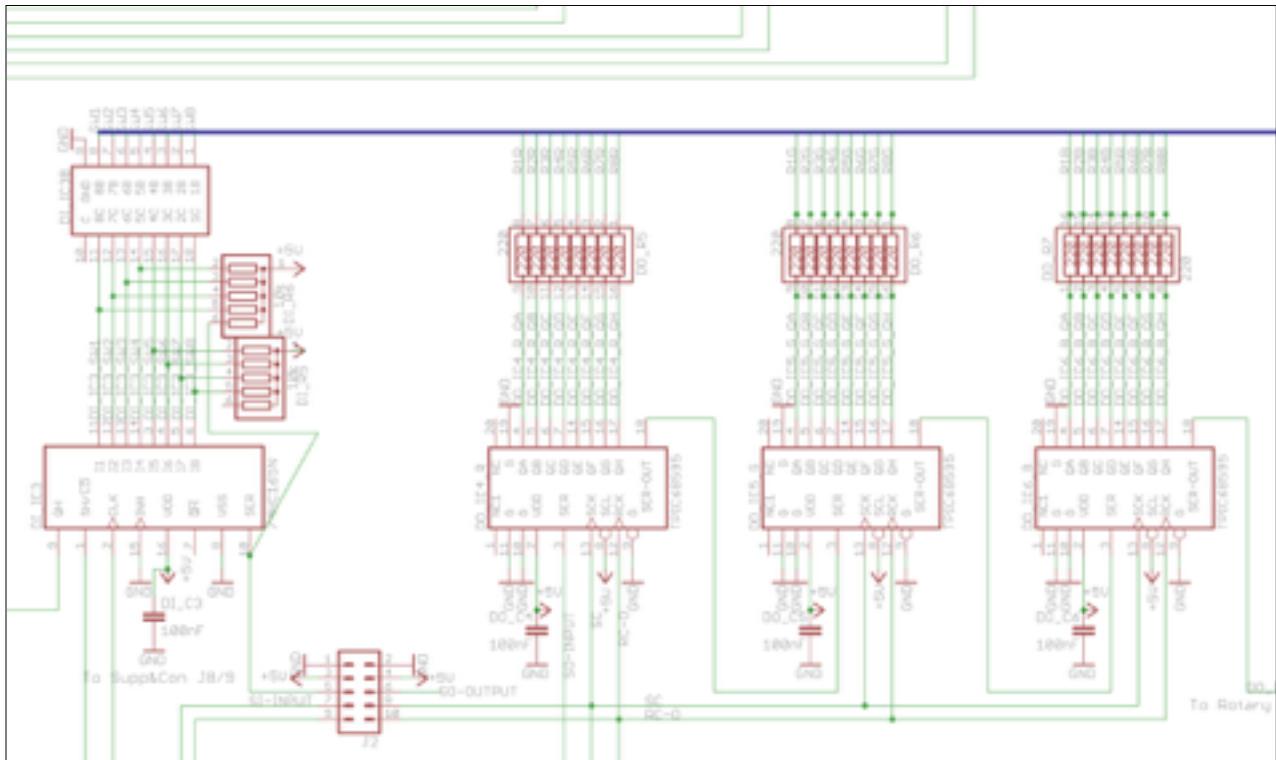
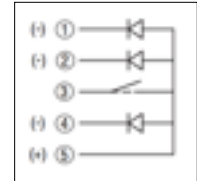
1. Page 1





1. The Encoder

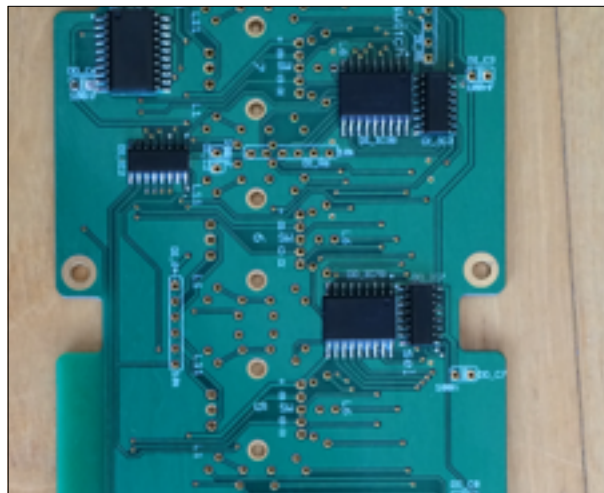
Its a Encoder with a RGB LED inside. The tricky thing was to make a driver that allows Midibox to control it over normal HC595 shift-registers because the circuit. The Cathodes of the LEDs are connected to the Switch as well. But i found a part that takes care of that. The TPIC6B595.



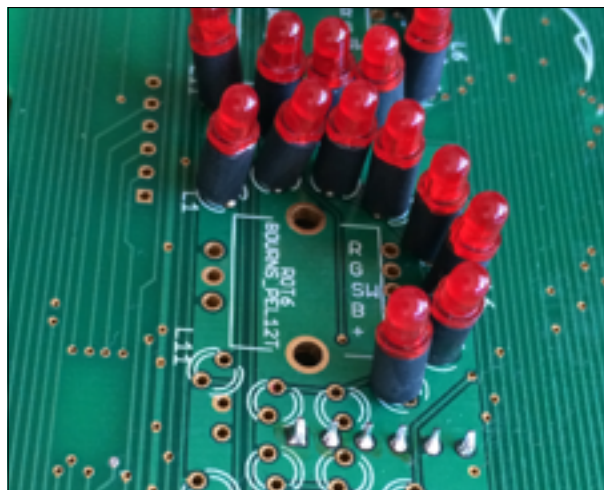
It works exactly as a HC595 but has a sink-driver like the ULN 2803 inside. So its perfect for that application.

2. Getting Started

Its recommended to Start with the SMD Parts and go on with the bigger Part sizes afterwards.
So start with al the ICs and then Solder the Resistors and the Caps, be sure to do so also for the resistor arrays because otherwise it gets a bit tricky to solder the shift-registers.They are due to the tricky layout quite close. As soon as you come to the LED be sure to have done all soldering on the Topside. At last solder the



Encoders so they stick out on the Topside as well as the LEDs. Soldering the Parts to the wrong side will damage the Parts.



3. Config

3.1. MIOS

Test it in MIOS

To make it work with MIOS .NGC File we need to know how the shift-registers are connected.

Inputs:

Shift Register number:

1# Encoder 1-4

2# Encoder 5-8

3# Encoder Button 1-8

Outputs:

Shift Register number:

1# RED Shaft LED 1-8

2# GREEN shaft LED 1-8

3# BLUE shaft LED 1-8

4# LED Ring Row 1-8

5# LED Ring Selct 1-8

6# LED Ring Select 9-11

To avoid strange behaviors in MIOS i strongly recommend to write this by your own in MIOS File browser. Im using my VLR-8oDisp board to show the Values of every item. You can change it to any other type of Display-setting... lcd_pos=6:1:5 {6=Display number : 1= X-axis : 5= Y-Axis (row)}

Assuming that the VLR-8Enc is the first device on the chain of J8/9 we need to configure it like this in the .NGC File:

```
RESET_HW
```

```
LCD "%C"
```

```
# Encoder configuration:
```

```
ENC n= 1 sr=1 pins=0:1 type=detented2
```

```
ENC n= 2 sr=1 pins=2:3 type=detented2
```

```
ENC n= 3 sr=1 pins=4:5 type=detented2
```

```
ENC n= 4 sr=1 pins=6:7 type=detented2
```

```
ENC n= 5 sr=2 pins=0:1 type=detented2
```

```
ENC n= 6 sr=2 pins=2:3 type=detented2
```

```
ENC n= 7 sr=2 pins=4:5 type=detented2
```

```
ENC n= 8 sr=2 pins=6:7 type=detented2
```

```
# LEDring configuration
```

```
DOUT_MATRIX n= 1 rows=16 mirrored_row=0 inverted_sel=1 sr_dout_sel1= 4 sr_dout_sel2= 0
```

sr_dout_r1= 5 sr_dout_r2= 6

Encoder events

EVENT_ENC id= 1 fwd_id=LED_MATRIX:1 type=CC chn= 1 cc= 24 lcd_pos=1:1:2 label="^std_enc"
LED_MATRIX_PATTERN=2

EVENT_ENC id= 2 fwd_id=LED_MATRIX:2 type=CC chn= 1 cc= 25 lcd_pos=2:1:2 label="^std_enc"
LED_MATRIX_PATTERN=2

EVENT_ENC id= 3 fwd_id=LED_MATRIX:3 type=CC chn= 1 cc= 26 lcd_pos=3:1:2 label="^std_enc"
LED_MATRIX_PATTERN=2

EVENT_ENC id= 4 fwd_id=LED_MATRIX:4 type=CC chn= 1 cc= 27 lcd_pos=4:1:2 label="^std_enc"
LED_MATRIX_PATTERN=2

EVENT_ENC id= 5 fwd_id=LED_MATRIX:5 type=CC chn= 1 cc= 28 lcd_pos=5:1:2 label="^std_enc"
LED_MATRIX_PATTERN=2

EVENT_ENC id= 6 fwd_id=LED_MATRIX:6 type=CC chn= 1 cc= 29 lcd_pos=6:1:2 label="^std_enc"
LED_MATRIX_PATTERN=2

EVENT_ENC id= 7 fwd_id=LED_MATRIX:7 type=CC chn= 1 cc= 30 lcd_pos=7:1:2 label="^std_enc"
LED_MATRIX_PATTERN=2

EVENT_ENC id= 8 fwd_id=LED_MATRIX:8 type=CC chn= 1 cc= 31 lcd_pos=8:1:2 label="^std_enc"
LED_MATRIX_PATTERN=2

Encoder Buttons

EVENT_BUTTON id=117 hw_id=17 fwd_id=LED:8 type=cc chn=1 cc=15 range=0:127
button_mode=OnOff lcd_pos=1:1:3 label="R^std_btn"

EVENT_BUTTON id=117 hw_id=17 fwd_id=LED:16 type=cc chn=1 cc=15 range=0:127
button_mode=OnOff lcd_pos=1:1:4 label="G^std_btn"

EVENT_BUTTON id=117 hw_id=17 fwd_id=LED:24 type=cc chn=1 cc=15 range=0:127
button_mode=OnOff lcd_pos=1:1:5 label="B^std_btn"

EVENT_BUTTON id=118 hw_id=18 fwd_id=LED:7 type=cc chn=1 cc=15 range=0:127
button_mode=OnOff lcd_pos=2:1:3 label="R^std_btn"

EVENT_BUTTON id=118 hw_id=18 fwd_id=LED:15 type=cc chn=1 cc=15 range=0:127
button_mode=OnOff lcd_pos=2:1:4 label="G^std_btn"

EVENT_BUTTON id=118 hw_id=18 fwd_id=LED:23 type=cc chn=1 cc=15 range=0:127
button_mode=OnOff lcd_pos=2:1:5 label="B^std_btn"

EVENT_BUTTON id=119 hw_id=19 fwd_id=LED:6 type=cc chn=1 cc=15 range=0:127
button_mode=OnOff lcd_pos=3:1:3 label="R^std_btn"

EVENT_BUTTON id=119 hw_id=19 fwd_id=LED:14 type=cc chn=1 cc=15 range=0:127
button_mode=OnOff lcd_pos=3:1:4 label="G^std_btn"

EVENT_BUTTON id=119 hw_id=19 fwd_id=LED:22 type=cc chn=1 cc=15 range=0:127
button_mode=OnOff lcd_pos=3:1:5 label="B^std_btn"

EVENT_BUTTON id=120 hw_id=20 fwd_id=LED:5 type=cc chn=1 cc=15 range=0:127
button_mode=OnOff lcd_pos=4:1:3 label="R^std_btn"
EVENT_BUTTON id=120 hw_id=20 fwd_id=LED:13 type=cc chn=1 cc=15 range=0:127
button_mode=OnOff lcd_pos=4:1:4 label="G^std_btn"
EVENT_BUTTON id=120 hw_id=20 fwd_id=LED:21 type=cc chn=1 cc=15 range=0:127
button_mode=OnOff lcd_pos=4:1:5 label="B^std_btn"

EVENT_BUTTON id=121 hw_id=21 fwd_id=LED:4 type=cc chn=1 cc=15 range=0:127
button_mode=OnOff lcd_pos=5:1:3 label="R^std_btn"
EVENT_BUTTON id=121 hw_id=21 fwd_id=LED:12 type=cc chn=1 cc=15 range=0:127
button_mode=OnOff lcd_pos=5:1:4 label="G^std_btn"
EVENT_BUTTON id=121 hw_id=21 fwd_id=LED:20 type=cc chn=1 cc=15 range=0:127
button_mode=OnOff lcd_pos=5:1:5 label="B^std_btn"

EVENT_BUTTON id=122 hw_id=22 fwd_id=LED:3 type=cc chn=1 cc=15 range=0:127
button_mode=OnOff lcd_pos=6:1:3 label="R^std_btn"
EVENT_BUTTON id=122 hw_id=22 fwd_id=LED:11 type=cc chn=1 cc=15 range=0:127
button_mode=OnOff lcd_pos=6:1:4 label="G^std_btn"
EVENT_BUTTON id=122 hw_id=22 fwd_id=LED:19 type=cc chn=1 cc=15 range=0:127
button_mode=OnOff lcd_pos=6:1:5 label="B^std_btn"

EVENT_BUTTON id=123 hw_id=23 fwd_id=LED:2 type=cc chn=1 cc=15 range=0:127
button_mode=OnOff lcd_pos=7:1:3 label="R^std_btn"
EVENT_BUTTON id=123 hw_id=23 fwd_id=LED:10 type=cc chn=1 cc=15 range=0:127
button_mode=OnOff lcd_pos=7:1:4 label="G^std_btn"
EVENT_BUTTON id=123 hw_id=23 fwd_id=LED:18 type=cc chn=1 cc=15 range=0:127
button_mode=OnOff lcd_pos=7:1:5 label="B^std_btn"

EVENT_BUTTON id=124 hw_id=24 fwd_id=LED:1 type=cc chn=1 cc=15 range=0:127
button_mode=OnOff lcd_pos=8:1:3 label="R^std_btn"
EVENT_BUTTON id=124 hw_id=24 fwd_id=LED:9 type=cc chn=1 cc=15 range=0:127
button_mode=OnOff lcd_pos=8:1:4 label="G^std_btn"
EVENT_BUTTON id=124 hw_id=24 fwd_id=LED:17 type=cc chn=1 cc=15 range=0:127
button_mode=OnOff lcd_pos=8:1:5 label="B^std_btn"

LED_MATRIX_PATTERN n=2 pos= 0 pattern=1111110000000000
LED_MATRIX_PATTERN n=2 pos= 1 pattern=0111110000000000

LED_MATRIX_PATTERN n=2 pos= 2 pattern=0011110000000000
LED_MATRIX_PATTERN n=2 pos= 3 pattern=0001110000000000
LED_MATRIX_PATTERN n=2 pos= 4 pattern=0001110000000000
LED_MATRIX_PATTERN n=2 pos= 5 pattern=0000110000000000
LED_MATRIX_PATTERN n=2 pos= 6 pattern=0000010000000000
LED_MATRIX_PATTERN n=2 pos= M pattern=0000111000010000
LED_MATRIX_PATTERN n=2 pos= 8 pattern=0000010000000000
LED_MATRIX_PATTERN n=2 pos= 9 pattern=0000011000000000
LED_MATRIX_PATTERN n=2 pos=10 pattern=0000011000000000
LED_MATRIX_PATTERN n=2 pos=11 pattern=0000011100000000
LED_MATRIX_PATTERN n=2 pos=12 pattern=0000011110000000
LED_MATRIX_PATTERN n=2 pos=13 pattern=0000011110000000
LED_MATRIX_PATTERN n=2 pos=14 pattern=0000011111000000

Apendix

** Midibox is a Opensource Brand of uCapps.de wich belongs to Thorsten Klose.