

# ENCOMAT — USERMANUAL

VERSION: 0.01

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Various repositories on GitHub under the username "novski"

The Manuals on [vrlab.com/support](http://vrlab.com/support)

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## 1. EncoMat

### 2. Connections

„J1“ is the connection to the Core.

„J2“ is the connection to more following modules

„1“ is to connect the first Encoderbreakout board and the following 8 connectors are for Enc 1-8.

### 3. Electrical Specification

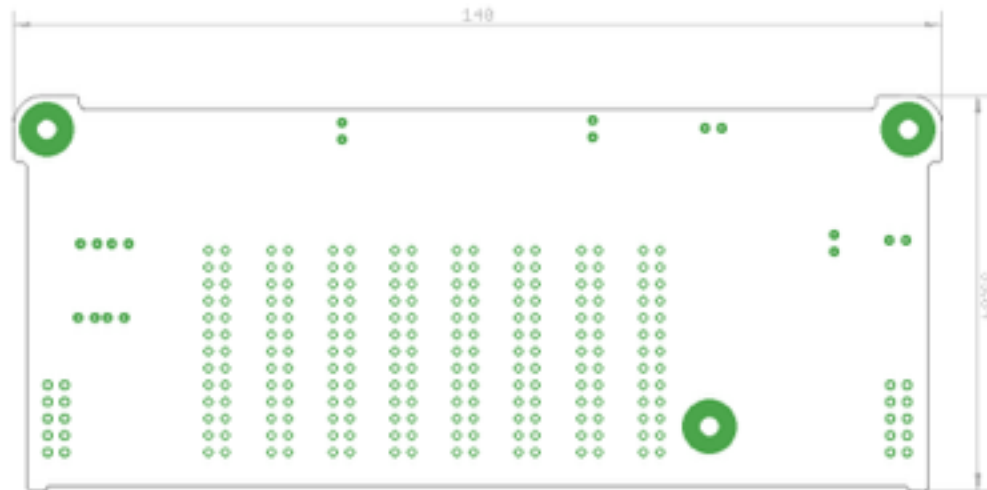
Supply Voltage: 5V

Power-consumption: ???

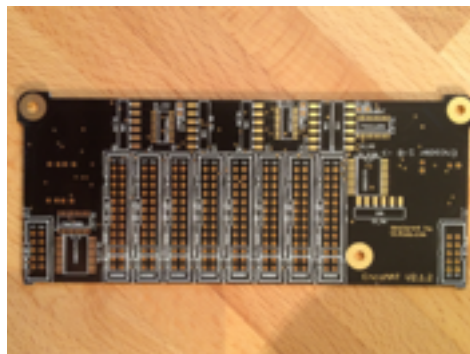
## 4. BOM

PART	VALUE	DEVICE	PACKAGE	LIBRARY	SHEET
DI_C1	100nF	C-EU025-024X044	C025-024X044	CAPACITOR, European symbol	1
DI_C2	100nF	C-EU025-024X044	C025-024X044	CAPACITOR, European symbol	1
DI_C3	100nF	C-EU025-024X044	C025-024X044	CAPACITOR, European symbol	1
DI_IC1	74HC165N	74HC165NSO16D	SO16D		1
DI_IC2	74HC165N	74HC165NSO16D	SO16D		1
DI_IC3	74HC165N	74HC165NSO16D	SO16D		1
DI_IC3B	ULN2803	ULN2803SO18W	SO18W		1
DI_R1	10k	4306R-SMD-R	SIL6-SMD-R		1
DI_R2	10k	4306R-SMD	SIL6-SMD		1
DI_R3	10k	4306R-SMD-R	SIL6-SMD-R		1
DI_R4	10k	4306R-SMD	SIL6-SMD		1
DI_R5	10k	4306R-SMD	SIL6-SMD		1
DI_R6	10k	4306R-SMD-R	SIL6-SMD-R		1
DO_C4	100nF	C-EU025-024X044	C025-024X044	CAPACITOR, European symbol	1
DO_C5	100nF	C-EU025-024X044	C025-024X044	CAPACITOR, European symbol	1
DO_C6	100nF	C-EU025-024X044	C025-024X044	CAPACITOR, European symbol	1
DO_C7	100n	C-EU025-024X044	C025-024X044	CAPACITOR, European symbol	2
DO_C8	100n	C-EU025-024X044	C025-024X044	CAPACITOR, European symbol	2
DO_C9	100n	C-EU025-024X044	C025-024X044	CAPACITOR, European symbol	2
DO_IC4_R	TPIC6B595	TPIC6B595SO20W	SO20W		1
DO_IC5_G	TPIC6B595	TPIC6B595SO20W	SO20W		1
DO_IC6_B	TPIC6B595	TPIC6B595SO20W	SO20W		1
DO_IC7	74HC595	74HC595SO16D	SO16D		2
DO_IC7B	ULN2803	ULN2803SO18W	SO18W		2
DO_IC8	74HC595	74HC595SO16D	SO16D		2
DO_IC9	74HC595	74HC595SO16D	SO16D		2
DO_R5	220	4816P-1SOIC16W	SOIC16W		1
DO_R6	220	4816P-1SOIC16W	SOIC16W		1
DO_R7	220	4816P-1SOIC16W	SOIC16W		1
ENCODER1	ML20-26COMBO	ML20-26COMBO	ML20-26COMBO		2
ENCODER2	ML20-26COMBO	ML20-26COMBO	ML20-26COMBO		2
ENCODER3	ML20-26COMBO	ML20-26COMBO	ML20-26COMBO		2
ENCODER4	ML20-26COMBO	ML20-26COMBO	ML20-26COMBO		2
ENCODER5	ML20-26COMBO	ML20-26COMBO	ML20-26COMBO		2
ENCODER6	ML20-26COMBO	ML20-26COMBO	ML20-26COMBO		2
ENCODER7	ML20-26COMBO	ML20-26COMBO	ML20-26COMBO		2
ENCODER8	ML20-26COMBO	ML20-26COMBO	ML20-26COMBO		2
J1		ML10	ML10	HARTING	1
J2		ML10	ML10	HARTING	1
MX_R1	220	4816P-1SOIC16W	SOIC16W		2
MX_R2	220	4816P-1SOIC16W	SOIC16W		2

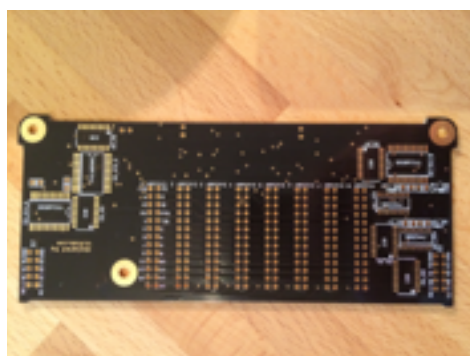
## 5. OUTLINES

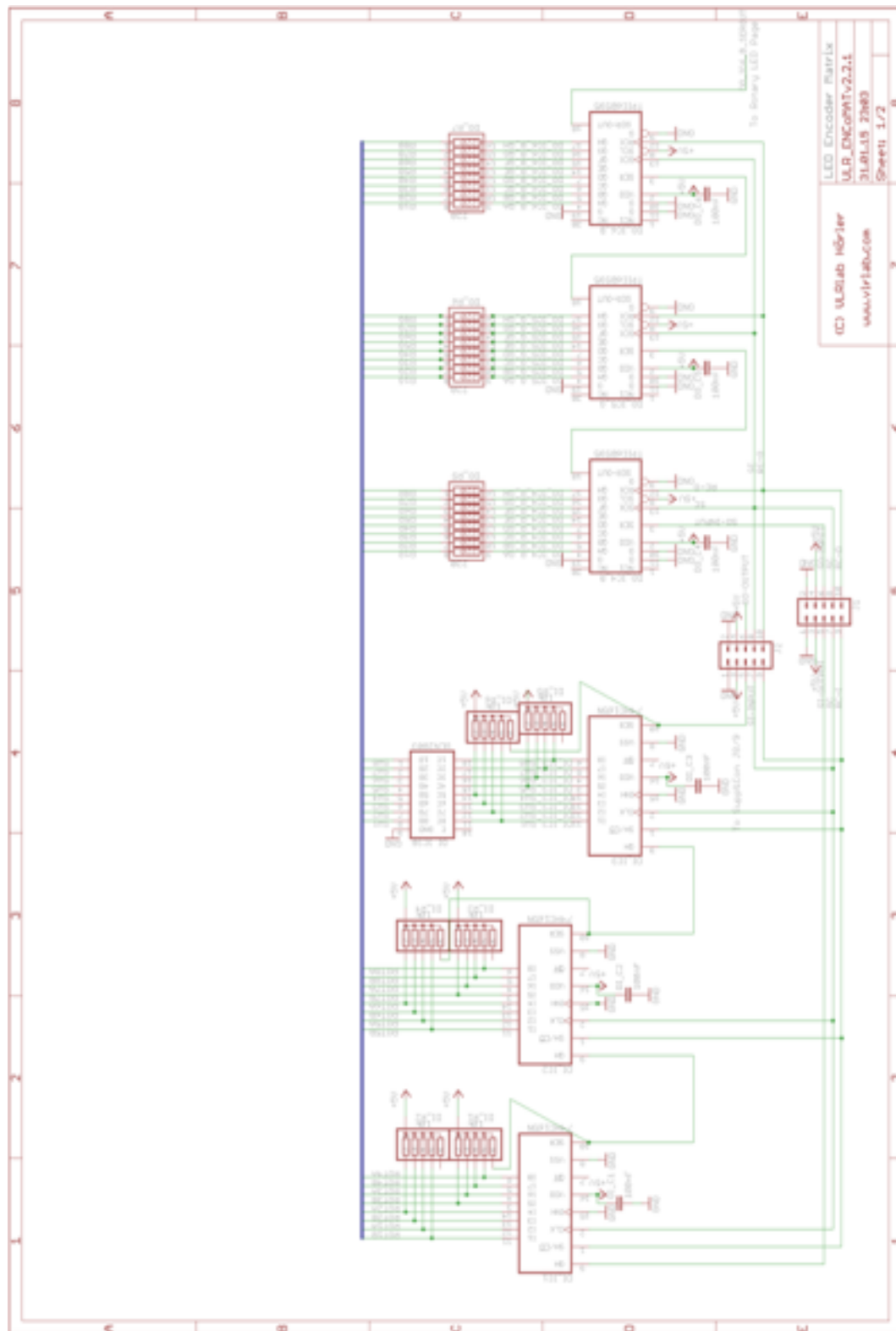


## 6. FRONTVIEW



## 7. REARVIEW

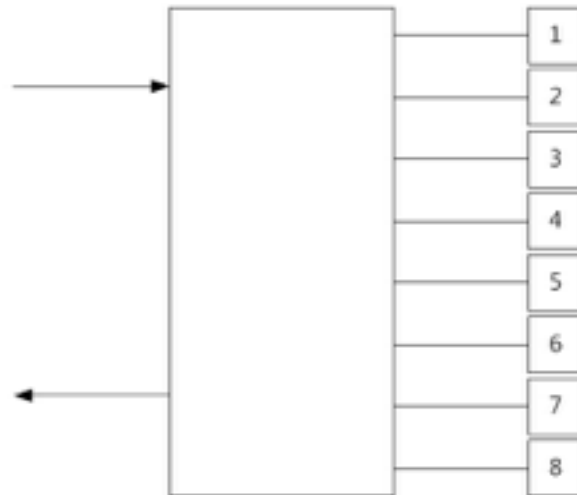








## 9. Block



The Idea of the Matrix is to give more flexibility to the builder and make it easy to integrate a Interface User friendly on a front plane.

## 10. Daugtherboards Views

Bourns RGB Encoder board

Bourns RGB Encoder 11 board

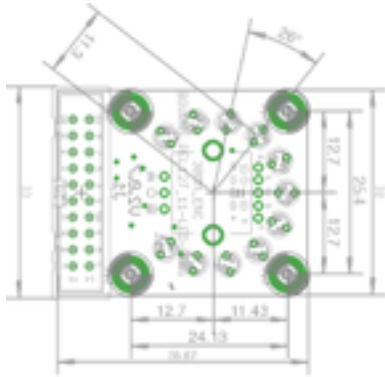
Bourns RGB Encoder 15 board



PART	VALUE	DEVICE	PACKAGE	LIBRARY	SHEET
DI_C1	100nF	C-EU025-024X044	C025-024X044	CAPACITOR, European symbol	1
DI_C2	100nF	C-EU025-024X044	C025-024X044	CAPACITOR, European symbol	1
ENC	Detended 24	Bourns PEL12T	PEL12T_11-LED-RING		1
J1		ML20	ML20	Harting	1
D1-11		LED3MM	LED3MM	LED	1

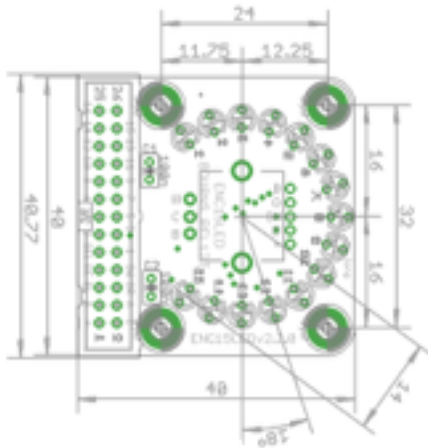
### 13. Bourns RGB Encoder 11 LEDs board

The 11 LED version is made for places where space matters.



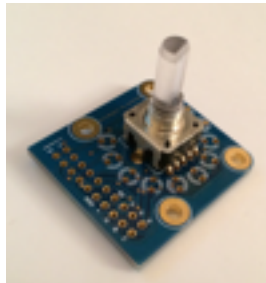
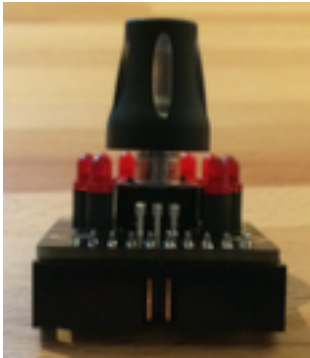
PART	VALUE	DEVICE	PACKAGE	LIBRARY	SHEET
ENC	Detended 24	Bourns PEL12T	PEL12T_11-LED-RING		1
J1		ML20	ML20	Harting	1
D1-15		LED3MM	LED3MM	LED	1

### 14. Bourns RGB Encoder 15 LEDs board



PART	VALUE	DEVICE	PACKAGE	LIBRARY	SHEET
D1_C1	100nF	C-EU025-024X044	C025-024X044	CAPACITOR, European symbol	1
D1_C2	100nF	C-EU025-024X044	C025-024X044	CAPACITOR, European symbol	1
ENC	Detended 24	Bourns PEL12T	PEL12T_11-LED-RING		1
J1		ML26	ML26	Harting	1
D1-15		LED3MM	LED3MM	LED	1

## 15. The Encoder



The Encoder has 3 LEDs in parallel with a Switch.



The shaft length is 26mm and the Hole Diameter has to be 7,1mm.

## 16. Config

### 17. MIOS

1. Test it in MIOS
  2. To make it work with MIOS .NGC File we need to know how the shift-registers are connected.
  3. **Inputs:**
  4. Shift Register number:
    - 1# Encoder 1-4
    - 2# Encoder 5-8
    - 3# Encoder Button 1-8
  5. **Outputs:**
  6. 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
  - 7.
  8. To avoid strange behaviors in MIOS i strongly recommend to write this by your own in MIOS File browser.
  9. 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)}
  10. Assuming that the VLR-EncoMat is the first device on the chain of J8/9 we need to configure it like this in the .NGC File:
  11.

```
RESET_HW
LCD "%C"
```
  12.

```
# 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
```

---

## 18. Mods

Its not necessary to use the LED Shift register. You can shortcut the tracks to save 3 SRs. IC7/8/9.

