SEQv4+ le MEC

This board holds the SEQ's illuminated buttons, which are driven from a shift register matrix. The ENC-PLATE board stacks on top.

Schematic

A shift register chain of 3 DIN 74HC165 and 2 DOUT 74HC595 chips are used. Two of the DINs scan the encoders and one scans the button columns. The DOUT parts are connected into a matrix. Note that both the high and low sides have driver transistors (PNP and NPN, respectively). This means that the anode side of the matrix will operate with inverted behaviour (pin high = LED off).

There are special instructions for connecting the parts which are covered below.

BOM v1.0

Type	Qty	Value	Package	Parts	Mouser	Reichelt	Conrad	Other	Notes
Resistors									
	1	wire link	THT	R17					
	18	47R 5%	THT	RJ1-9					see instructions
	8	100-220R 5%	THT or 1206	SJ1-8					see instructions
	16	1k 5%	THT	R1-16					
Resistor networks									
	3	9*10k	SIP10	RN1-3					
Capacitors									
	5	100n	1206	C1-5					
	0	do not fit		C6					
Diodes									
	24	1N4148	THT						
LEDs									
	16	RGB flat	superflux					ELV: 68-10 94 64	see instructions
	8	various	3mm						insert into switches
Transistors									
	8	BC808	PNP SO-23						
	8	BC818	NPN SO-23						
ICs									
	3	74HC165	SOIC16	IC1, IC3, IC5	595-SN74HC165DR				

Type	Qty	Value	Package	Parts	Mouser	Reichelt	Conrad	Other	Notes
Resistors									
	2	74HC595	SOIC16	IC2, IC4					
Switches									
	16	Matias	QuietClick	SW1-16					see notes
	8	MEC/APEM	3FTH9	SW17-24	642-3FTH9	TASTER 3FTH9	705276 - 62		
Headers									
	1 (3)	1*3	male						
	3	1*10	male						
	2	2*5	male						
Hardware									
	16	switchcaps	ALPS-DSA clear						
	8	switchcaps	22.5mm		642-1S11-19.0		1S11-19.0		

note that two sets are required per SEQv4+ build!

Versions

v1.0: first release.

Assembly

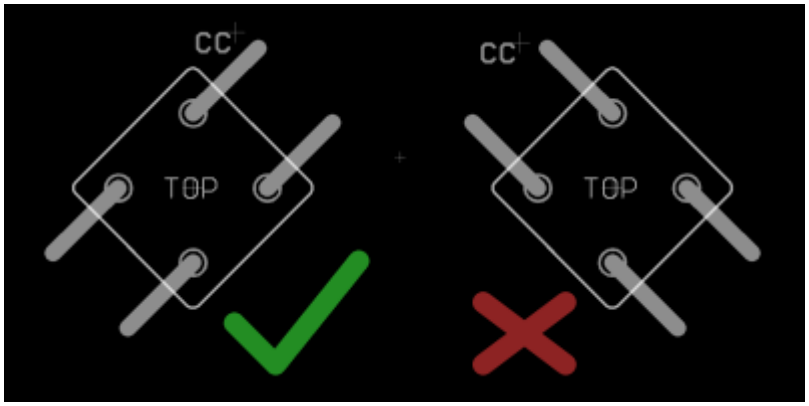
Take your time as some of these parts require some patience.

LEDs

High-brightness LEDs are often expensive or don't have viable mounting options. To get around this, we will use flat-top superflux/piranha RGB LEDs and bend the legs over to make a pseudo SMT part :). There are at least two different LED pinouts, so make sure you know how yours function.

Important is:

- Flat top (or maybe a filed-down dome)
- RGB LEDs with a common cathode
- With the LED standing on its legs, viewed straight on, rotated 45° and the cathode at the top, **the cathode leg must bend to the right**. You will see why!



- Get the board as flat as possible, rear side facing up. If the LEDs protrude through the PCB cutouts, they will prevent the switches from being soldered in later.
- Identify the LED cathode and place it in the 45° hole with the cathode aligned with the common cathode (CC) pin.
- Stating the obvious: the LED legs should be pointing up!
- Using a screwdriver or other tool, bend the LED legs down, first against the body then so the leg runs flat against the pad.
- You may wish to leave the cathode pins unbent for now, as these should either be soldered carefully so the switch can still go in or simply left until it is time to install the switches.
- Probably bend all of the LEDs first before soldering any.
- Solder at least the three anode pins, again making sure that no LED protrudes through to the front side of the board and that the cathodes are in the correct positions.

Transistors

- Transistors T9-16 (BC808 PNP) are soldered on the top side of the board. When the whole thing is assembled, these will not be accessible, so it's important to do them right.
- Don't mix them up with the BC818 NPN transistors!
- Transistors mount square on. Don't try to mount at a funny angle!

Bottom-side components

- SMT resistors
- Now you can use the BC818s! Note they are distributed across the board.
- Resistors R18-25 adjacent to the transistors can be omitted
- ICs1-5. **Note that the 595s point in a different direction to the 165s**!
- Diodes, apart from the one next to C6, which is omitted. Ensure the legs won't interfere with the Matias switches.
- THT resistors R1-16
    - take special care with R2, R3, R13 and R14 that the legs are as short as possible (even top-solder them). The encoder legs from the PCB stacked above will come down here.
- pin headers (top side)
- resistor networks (bottom side). It's very important to have the pin 1 dot aligned with the silkscreen marking

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