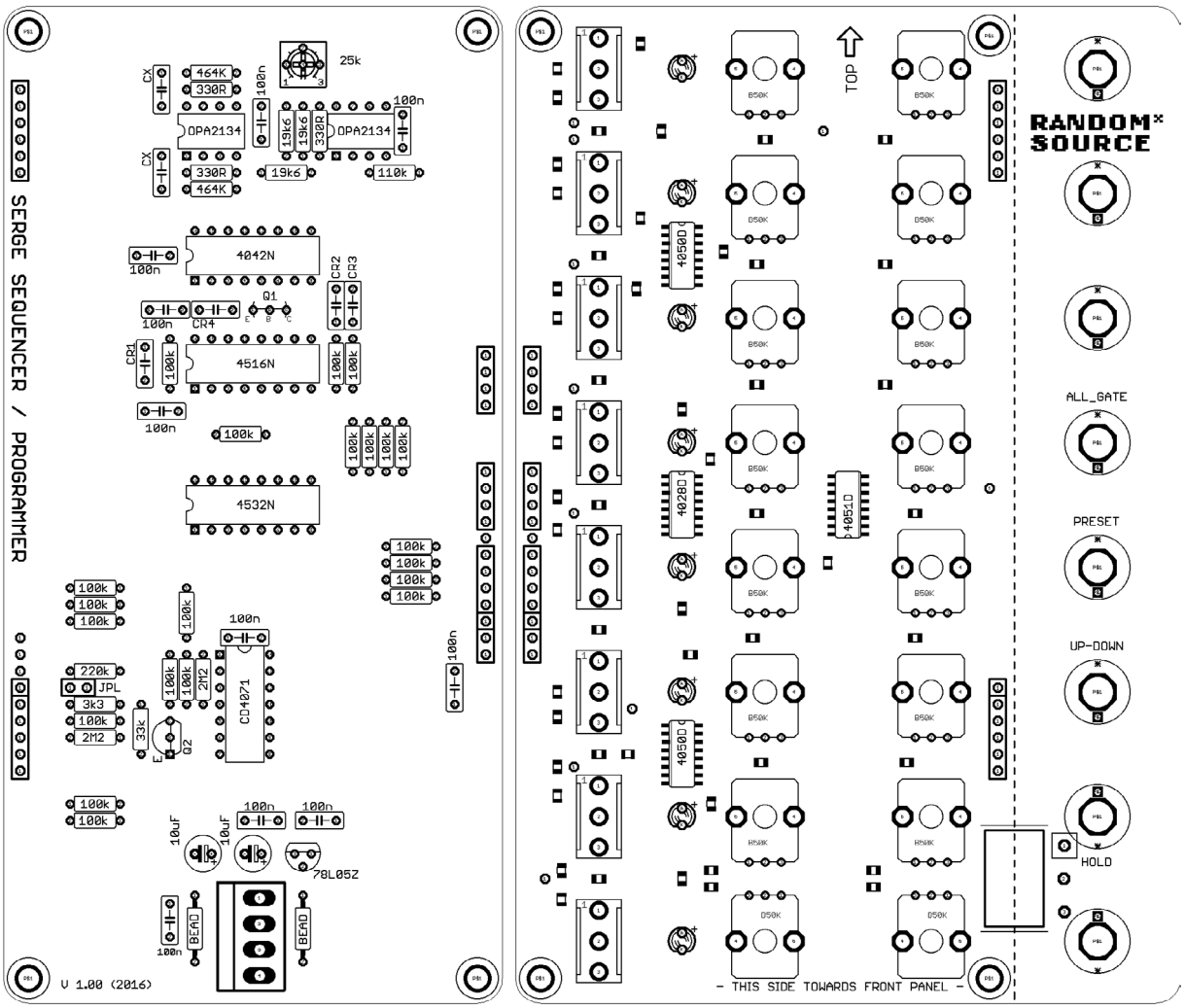
SERGE 8-Step Sequencer/Programmer

The Serge Sequencer 8 covers a wide range of uses from sequencing / storing presets (“programming”) to wavetable-like sounds in the audio range. The Sequencer 8 by Random*Source is a licensed and authorized adaption of the original Serge design. Compared to previous versions of the Serge Sequencer, the R*S version features:

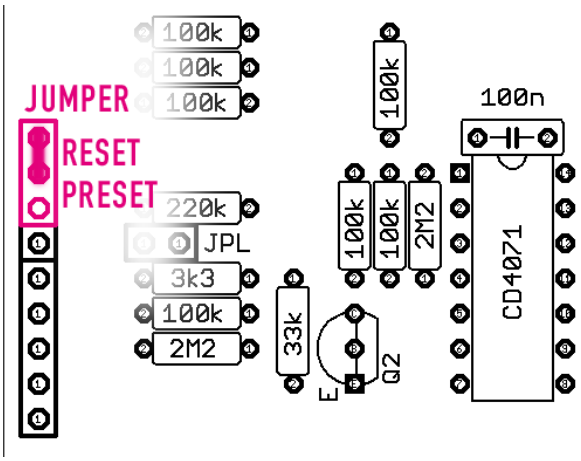
- Improved speed / accuracy - clean stepped waveform output up to clock frequencies of 10kHz and above.
- Gate Output allows the Sequencer’s pushbuttons to be used as a mini keyboard.
- Wireless - only the ON-OFF switch requires some wiring.

The R*S module consists of a 3” main pcb and a 4” panel pcb serving as an interface to the front panel:



Please note:

- Board is designed to be powered by a +/-12V stabilized PSU only.
- The silkscreen on the board shows the **original values** for the A-B output section (19k6, 110k and trimmer). **Alternatively** you can use 10k for every resistor instead and omit the trimmer - that leads the output to be the (pretty) exact difference between A output and B output, i.e. if A is 0V and B is 5V you get -5V. Please **see the comments in the BOM below.**
- To connect the 2 pcbs, you only need to join the pins within the white boxes - **ignore all pin holes outside these white boxes**.
- **Pay attention to the orientation of the momentary switches (pushbuttons)! The have to be mounted that the top and center pin are linked when the button is pushed** (i.e. pin NC is towards the bottom). Installed upside-down the buttons will not work / have no effect!
- **Leave the jumper marked JPL open.**
- Add a jumper or link to configure the RESET input to RESET or PRESET mode - this determines if a high signal at the input will reset the sequencer to stage 1 (and low signal means free running) or the other way around.



- You might consider using a black (bipolar) or gray banana jack for A-B out as the result can be negative. Traditionally the color seems to be blue (white), though. I find

Bill of Materials

Resistors (1%)

2	BEADS	F1, F2	FERRIT BEADs
3	330R	RS35, RS37, RS40	
1	3k3	RS20	
3	19k6* (10k)	RS38, RS39, RS41	*Original values that determine the A-B output. However, use 10k for each of the 4 values instead to get an exact A-B subtraction.
1	33k	RS33	
21	100k	RS17, RS18, RS19, RS21, RS22, RS23, RS24, RS25, RS27, RS28, RS29, RS30, RS31, RSA, RSB, RSC, RSD, RSE, RSF, RSG, RSH	
1	110k* (10k)	RS42	*see above - use 10k for exact A-B output
1	220k	RS32	
2	464k	RS34, RS36	or 453k - sets max A and B output voltage, 417k should give exactly 5V, higher values mean higher max output.
2	2M2	RS1, RS26	

Capacitors

10	100n		Bypass caps - Film or other, 5mm lead spacing
2	10uF	C1, C2	Electrolytic (or 22uF) >= 25V, 2.5mm ls
2	33p to 100p	CX	Make the corners of A and B outputs rounded. This affects the sound in audio use. Use 33p for very little softening or up to 100p for little more. 33p is still fast enough to rund the Sequencer on a 8kHz or faster clock (eg. using a R*S DSG mk2) and still get a nice clean waveform.
1	10n	CR4	BOM update!
3		CR1, CR2, CR3	optional - probably not needed

ICs

1	78L05Z	IC11	Positive VOLTAGE REGULATOR
1	2N3904	Q1	NPN Transistor
1	BC560C, 2N3906 or similar	Q2 - optional -	PNP Transistor - only neded for PRESET mode - check pinout, printed outline is for 2N3906, BC560C has to be turned 180°!
2	OPA2134		Operational Amplifier
1	CD4042BE		Quad clocked D LATCH
1	CD4071BE		Quad 2-input OR
1	CD4516BE		Binary up down COUNTER
1	CD4532BE		8-bit PRIORITY ENCODER

Trimmers

1	25K*	A-B adjustment (only when using original values)	Trimpot (Bourns 3362P or Vishay T73YP202KT20 or anything that matches the footprint). Omit when using the (recommended) 10k value set.

Misc

1	MTA-156		MTA-156 power connector
8	LED lenses 3mm		
8	LED 3mm	low current (max) 2mA	pick color to suit LED lens - panel pcb contains 3k3 LED resistors, so pick brightness of LED to reflect that (i.e. not too bright)
8	Momentary Pushbuttons	OFF - (ON) mind the direction when mounting!	C&K Pushbutton: Mouser: 611-8125-222 Dress Nut: 611-702501201 Red switch Cap: 611-801803000
1	SPDT Switch	ON - OFF / ON - ON	NKK M2012SS1W01 (no cap) or NKK M2012SS1W01-BB (white cap) or similar
16	Potentionmeter 50k or 100k	linear (B50K or B100K)	Alpha 9mm vertical pcb mount available from Thonk, Tayda
16	Knobs		Davies or similar matching the pots
1	SIL header 7pol		pin connectors, linking main pcb to component pcb - using precision strips allows to break off pieces as needed
2	SIL header 6pol		
2	SIL header 4pol		
5	Banana Jacks	(red)	Emerson-Johnson Mouser: 530-108-0902-1 (red) or Thonk
3 or 2 + 1	Banana Jacks	CV / unipolar (blue or white) or 2 white, 1 gray (A - B)	Emerson-Johnson Thonk / Mouser: 530-108-0910-1 (blue), 530-108-0901-1 (white)

Building

This is simply a suggestion - you might find a different workflow more practical:

1. Mount the banana jacks, the pushbuttons (top 2 pins are used, **NC pin should face toward the bottom!**), the LED lenses and the SPDT switch onto the front panel.

2. Use a side-cutter to separate main pcb and component pcb. Add spacers (10mm, M3 hex) to the pannel pcb if you want.

3. Main pcb and panel pcb are to be connected through precision DIP socket and pins. It is recommended to use the pins on the main pcb (facing down, soldered from above) and the pin sockets on the component pcb (standing up, soldered from the front panel side). Break or cut off the pieces you need and stick them together so that main pcb and component pcb form a nice sandwich (don‘t solder yet). Check that you didn‘t leave out any pins / holes and that the sockets are all on the same side (component pcb). Solder all the pins in while keeping the sandwich

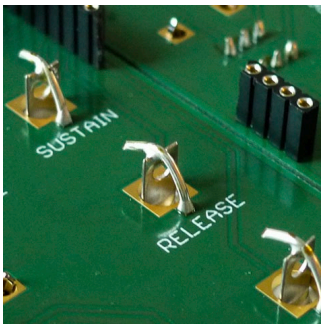
together - this avoids any misalignments.

4. Carefully separate the sandwich - if you used precision sockets, this may not to too easy - they stick together nicely (giving a good connection).

5. Mount the pots and the LEDs onto the component pcb. Pots should sit on the side facing the front panel (as marked on the board). Don‘t solder them in yet.

6. Carefully mount the component pcb onto the front panel. Push the LEDs into the LED lenses (they should snap in). Once everything is nicely in place and you didn‘t forget anything, solder pots and LEDs.

7. Solder the banana jacks in. You can either solder them directly to the surrounding vias (i.e. the ring around) or - which makes removing easier should you ever need to do that - by inserting a stiff (bare) wire into the little hole (via) and solder that wire to the top of the banana jack:



8. Stuff the main board, beginning with the resistors, then caps etc.

9. Mount the main pcb onto the panel pcb.

10. Connect a power cord supplying +12V, GND, GND, -12V to the MTA-header on the main board and you should be ready to go :-)

Calibration

No calibration required if you use the 10k value set.

(Version 22 September 2016)