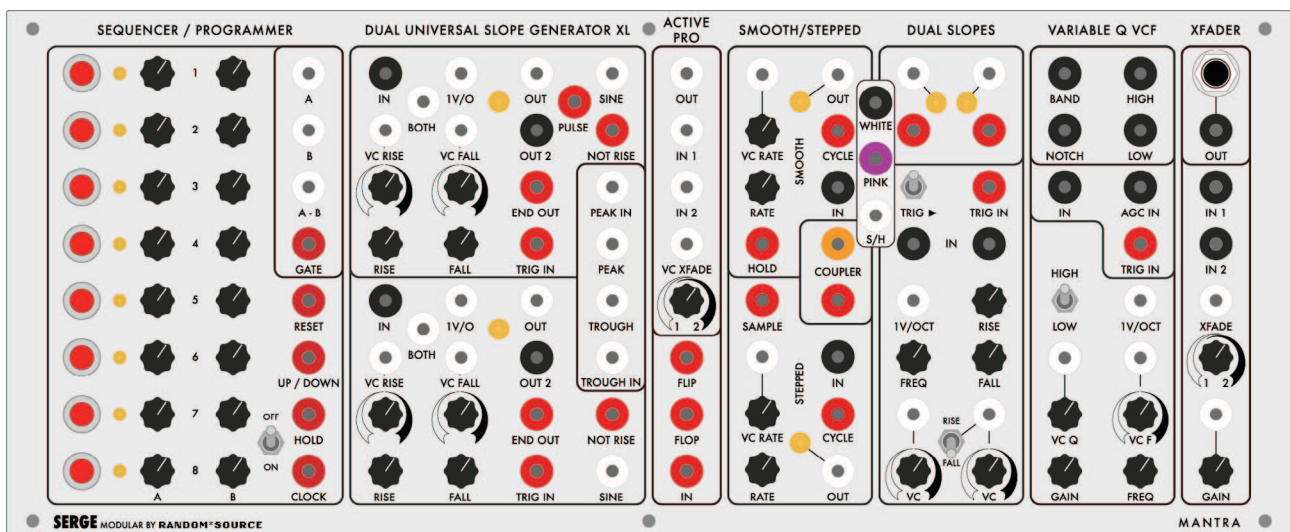


SERGE MANTRA



The Serge MANTRA panel is a unique and very powerful Serge panel that comprises a number of modules and functions that have never been available before.

- **Sequencer 8 (SEQ8):** the classic Serge Sequencer optimized for audio speeds and with a new GATE output that allows the pushbuttons to be used as a mini-keyboard.
- **Dual Universal Slope Generator XL (DSG mk2 XL):** a massively enhanced 2018 version of the famous Serge DSG module. The DSG has been optimized for better tracking (up to 4 octaves), temperature stability and speed. On top of a DSG mk2, it features SINE(oid) outputs, NOT RISE outputs, additional VC BOTH inputs, a PULSE OUT in the top half plus an integrated Serge PEAK & TROUGH. Most likely the most versatile and powerful Serge module ever.
- **Active Processor (ACPR):** The top section is a new 2017 version design by Serge by Serge himself, improving the original linear crossfader. The bottom section is a new FLIP-FLOP module, that takes a pulse sequence as input and generates alternating gate signals on the two outputs for a number of uses, such as pulse divider (/2) or sub-oscillator.
- **Smooth & Stepped Generator (SSG):** the R*S version of the classic Serge westcoast module, optimized for audio. The SSG is one of the deepest Serge modules, providing a number of uses: as oscillator / LFO, audio filter, glide, sample-and-hold and many more. In combination with the Serge Noise, the SSG can be patched as a Random Voltage Generator.
- **Serge Noise (NOI):** white noise, pink noise and a crazy saw as S/H source.

- **Dual Slopes (DSG mk2)** a.k.a. "TimeGen Osc": another incarnation of the DSG mk2 where the left side is hard-wired to cycle for oscillator or LFO duties, offering the same improved tracking and stability.
- **Variable Q Filter (VCFQ)**: the most popular, extremely versatile Serge filter offering simultaneous low-pass, high-pass, band-pass and notch (band-reject) outputs. The resonance (Q) of this filter is dynamically variable by manual or voltage control. The VCFQ has two signal inputs. One incorporates an automatic gain control to prevent the filter from overloading at high Q settings. The second input has a level control so that the percussive effects of overloading the filter can be exploited.
- **X-Fader (XFAD)**: an audiophile version of Serge's equal-power cross fade unit, featuring a **balanced output**. The exponential VCA section offers the unique Serge VCA response and beautiful overdrive possibilities.



Things you should know

Banana Colors

The banana colors try to follow a basic scheme, however, traditionally that scheme is not completely free of contradictions - here's our take:

RED	Logic signal / Pulse / Gate / Trigger. A rectangular waveform which can of course be used for audio, too. Usually 0-5V.
WHITE	Unipolar signal ("DC") for CV or audio, range is also usually 0 to 5V.
BLACK	Bipolar signal ("AC"), range is often from about -2.5V to 2.5V, but may differ in some cases.
GRAY	Some outputs can be configured (via a jumper on the pcb) to either unipolar or bipolar. Gray indicates that the output may be set to either one. Also used for unusual outputs like the A-B in the SEQ8 which goes from 5V down to -5V depending on A and B.

(Almost) Everything Goes

- Forget the distinction between CV and audio - any signal in the Serge worlds can be used as anything.
- Don't worry about patching "wrong". Even though each banana jack is (typically) either an input or an output, don't think too much about a patch and don't be afraid to plug a cord into the wrong jack - you may get unexpected or no results if you do connect jacks, but there's no harm in that.
- The cycle mode of some modules (DSG, SSG) is sensitive and the CYCLING can be stopped if you "drown" or "override" the signal in the cycle (between the output and the input) - e.g. by connecting it to another signal or ground: the right side of the Dual Slopes for instance is designed to be either triggered by the left side (via the switch) **or** by itself (by connecting the two red jacks) **or** by another pulse signal (e.g. CYCLE from the SSG). If you use the trigger switch **and** another signal at the same time, it is easy to get the left side of the DSG to stop cycling. In such case, you can simply remove that second signal and send another signal into the (black) IN jack of the module to re-animate it - the cycle should then work again.
- The output of the XFADER is balanced and can (depending on GAIN and CV settings) reach very high levels (i.e. get very LOUD!). This could lead to clipping or overload when routing the output into external equipment (ADC converter, mixing console). The best option here is to adjust the input level on the gear receiving the signal - this preserves the best signal to noise ratio. However, you can also scale the output level of the XFADER down with the (top) trimmer on the XFADER pcb.

Patch-Ideas

SEQ8 and DSG as Oscillator

1. Patch the A (or B) output of the SEQ8 into the 1V/OCT input of a DSG (XL or Dual Slopes). The DSG has to be in Cycle mode - the left side of the Dual Slopes does that automatically, for any other DSG, simply connect the GATE OUT to TRIG IN.
2. Connect the normal (white) output of the DSG to IN 1 of the XFADER and turn the XFADE knob down to 1.
3. Turn the GAIN of the XFADER all the way down (to protect your ears and speakers). Connect the output of the XFADER to a mixer or AD-converter or stereo system - something you can listen to. Then carefully turn up the GAIN until you hear something.
4. Turn the A knob of the active SEQ8 row all the way down, then set the RISE and FALL of the DSG to the lowest desired pitch (and tone).
5. Now select each row of the SEQ8 by pressing the button and dial the A knob of each row to the desired pitch.
6. You can use another (cycling) DSG to advance the SEQ8 by sending a GATE OUT (or PULSE OUT) into the CLOCK IN (make sure the Switch is set to ON on the SEQ8).

The diagram illustrates the front panel of a Moog Proton synthesizer, organized into five main sections:

- OR XL:** Includes controls for SINE, OT RISE, PEAK IN, PEAK, ROUGH, ROUGH IN, OT RISE, and SINE.
- ACTIVE PRO:** Features OUT, IN 1, IN 2, VC XFADE (with a 1-2 scale), FLIP, FLOP, and IN.
- SMOOTH/STEPPED:** Divided into two modes. The SMOOTH section includes VC RATE, RATE, HOLD, SAMPLE, IN, and COMPLER. The STEPPED section includes VC RATE, RATE, CYCLE, and OUT.
- DUAL SLOPES:** Includes WHITE, PINK, and SA (with a 1-2 scale) buttons, TRIG, IN, 1V/OCT, FREQ, RISE, FALL, and two VC (Vibrato Control) knobs with RISE and FALL settings.
- VARIABLE:** Includes BAND, NOTCH, IN, HIGH, LOW, VC Q, and GAIN.

Three colored lines trace paths through the panel:

- Red line:** Starts at the SMOOTH/STEPPED IN knob, goes to the COMPLER knob, and then to the DUAL SLOPES TRIG knob.
- Blue line:** Starts at the SMOOTH/STEPPED IN knob, goes to the COMPLER knob, and then to the DUAL SLOPES IN knob.
- Green line:** Starts at the SMOOTH/STEPPED IN knob, goes to the COMPLER knob, and then to the DUAL SLOPES TRIG knob.

1. Patch the „hot“ (top) Coupler output into the IN of the Smooth side.
2. Patch the „hot“ (top) Coupler output also into the SAMPLE input of the Stepped side.
3. Run the S/H OUT of the NOISE into the IN of the Stepped side and turn up the RATE on the Stepped side.
4. Use the Smooth RATE to control the speed of movement.

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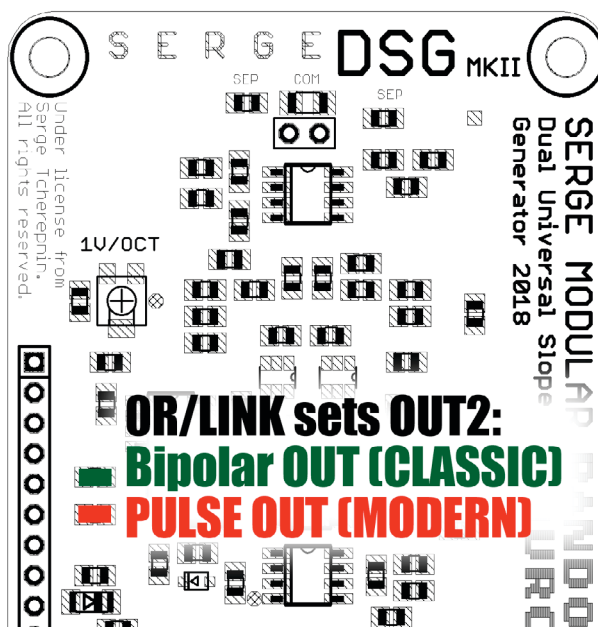
DIY - Building the MANTRA Panel

Some things to consider before you start building a MANTRA panel:

- This is a project **for experienced builders only**. Even though all the pcbs are SMT-populated, there is still enough opportunity for errors and mistakes. You should not try to build a panel unless you have successfully built a couple of R*S 4U modules before and have the appropriate tools and equipment (a good DMM and an oscilloscope is mandatory, a lab power supply highly recommended).
- Consider the enclosure (boat) before you start building. MANTRA can be built to fit into an R*S superslim boat, however, that means you cannot use any MTA-156 headers on the top level pcbs and therefore requires some wiring consideration.
- Consider how your panel will be powered. Mantra and all of its modules is designed to run on a stabilized PSU providing **+12V and -12V**. It draws roughly **400-440mA** per power rail.
- A special PSD (2" wide) has been designed to sit on top of the VCFQ-filter. For this, the filter pcb must not have any MTA-156 headers, but should be connected to the PSD using 10mm spacers and two pinstrip-rows (left and right) powering the VCFQ. This way the PSD can be easily removed.
- Please refer to the individual documentation for each module.

Technical Aspects:

- Use antistatic precaution when handling any pcbs containing SMT - don't touch the small SMD parts and ICs with your hands.
- The **DSG XL** requires a DSG version 1.33 (main) pcb configured as "**CLASSIC**" version, i.e. so that OUT2 is set to deliver the BIPOLAR output signal. Check that (only) the the upper link / 0 Ohm resistor (here shown in green) has been installed:



(Last Change: 9. September 2018, 9:10 PM)

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