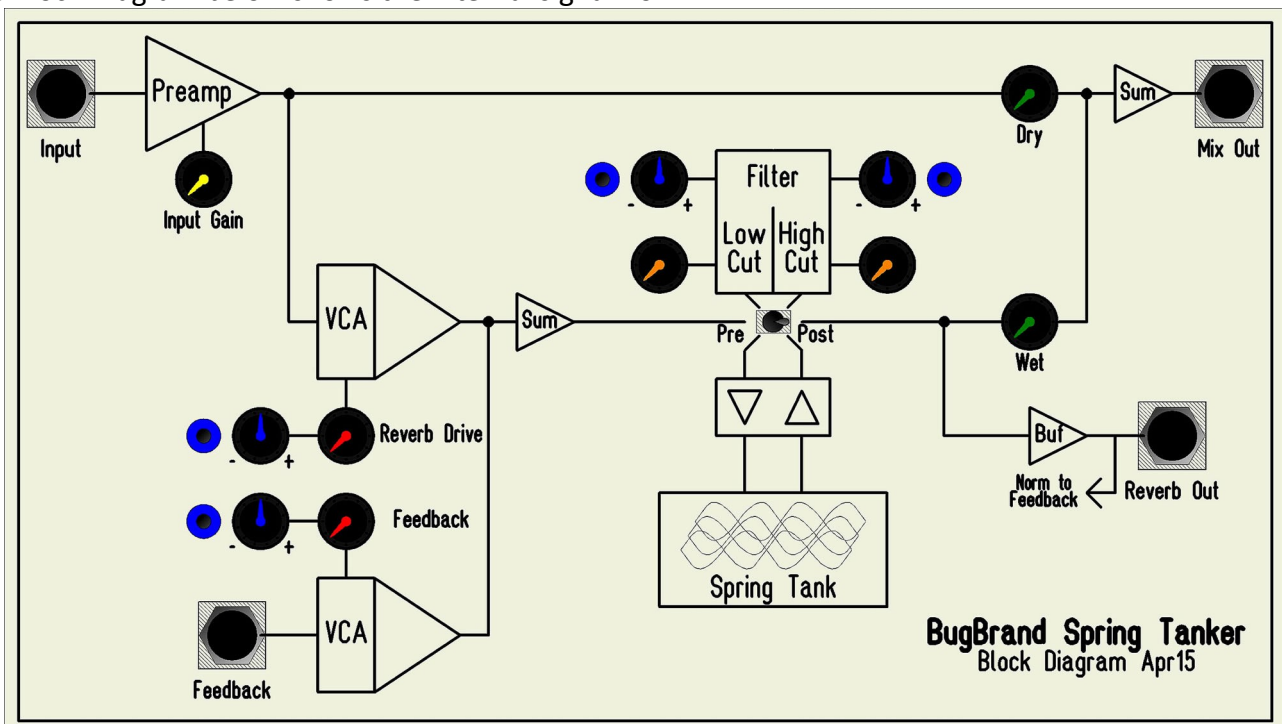




The **BugBrand Spring Tanker** takes a compact Spring Reverb Tank, builds around it the particular drive & recovery circuitry required by such electro-mechanical devices, then surrounds this core with Voltage Controlled analogue processing – the result is a highly playable effects box which massages and transforms the feel of any audio it is fed.

The Voltage Controlled elements, VC-Amps and Filtering, allow parameters to be automated by external sources such as Sequencers or LFOs, tying the machine in to your analogue studio flow. The Spring Tank is presented exposed so that you can (gently) massage extra mechanical disturbances to the Reverb.

The Block Diagram below shows the internal signal flow:



**Input Preamp:** The mono unbalanced 1/4" jack input (66k Ohm Impedance) is designed for typical line level signals with the *Input Gain* control offering up to 20dB amplification to bring signals up to suitable internal levels. For general line levels, gain will generally be set between about 12 and 3 o'clock. Reduce the gain for higher input levels (eg. Modular). An internal jumper allows input limiting to +/-5V, giving soft clipping when the gain is pushed – this jumper is set to Off when units are produced to give cleanest input signals.

**Reverb Drive Voltage Controlled Amplifier (VCA):** A Linear VCA controls how much of the audio input passes to the Reverb Core. This section has an Initial *Reverb Drive* control and an *Polarising CV Modulation* depth control (see below for Control Voltage details).

**Feedback VCA:** A second Linear VCA controls how much of the Reverb Signal is fed back to the input summing stage, again with initial *Feedback* control and *Polarising CV Modulation*. The *Feedback* Input (unbalanced mono 1/4") is normalised from the *Reverb Out* – this normalisation can be broken by inserting a plug into the socket, for example taking the Reverb Out to an external audio processor, then returning it via the Feedback Input.

**Voltage Controlled Filters (VCF):** A pair of 6dB/Oct VC-Filters can be placed before (pre) or after (post) the Reverb Core. Each filter covers the full audio spectrum and features a *Low/High Cut* control and a *Polarising CV Modulation* depth control. For default / no-processing turn the Low Cut control fully counter-clockwise and the High Cut control fully clockwise.

**Spring Tank Driver / Recovery:** Given their electro-mechanical nature, Spring Reverb Tanks require low-noise conditioning circuitry to drive the signal transducer at one end and to pick up the resulting movements at the other end of the Spring.

A diode clipping stage is built in to the Recovery Amp, set to only limit signals above normal levels. This takes care of runaway feedback or excessive mechanical movement (eg. through poking the Spring).

Note that the unit should not be used close to strong sources of EMF (Electro Motive Force) such as power transformers, fluorescent lights, etc.

**Mix / Reverb Outputs:** A mixer with *Dry* and *Wet* level controls sums the audio input with the reverb signal, before outputting on the impedance balanced 1/4" *Mix Out* jack socket (Output Impedance 100 Ohms).

The Reverb signal is also buffered and sent to the direct *Reverb* output (again, impedance balanced 1/4") which also provides the normalisation source for the Feedback path.

**CV Control:** Four Control Voltage (CV) inputs are provided on 4mm banana sockets, with each featuring a *Polarising Modulation Depth* control which allows an input CV to be attenuated and/or have its polarity inverted.

For each control, the central position means no modulation (0) – turning the control clockwise increases the modulation depth up to full, while turning the control counter-clockwise increases modulation but with the signal inverted. CV Inputs are standard 100k input impedance and work best with a voltage swing of 10V peak-to-peak (absolute max +/-15V).

As 4mm banana cables do not carry a ground connection, you must first establish a 0V ground reference between the Spring Tanker and any external device before patching CV signals.

**Banana-to-Banana:** External banana systems should have a Grounding socket, typically located on the Power Supply – connect a banana cable between this and the Spring Tanker's black GND socket.

**Banana-to-Jack:** The first connection is made with a two wire 'Grounded' cable which establishes the common ground reference. The Black cable (connecting to Jack Sleeve) plugs to the Black GND socket on the Spring Tanker and the White Cable (connecting to Jack Tip) plugs to the CV destination. Further connections from the same piece of equipment can then be made using just a single wire 'Signal' Cable.

**Power:** The unit comes with a universal (90-264V AC) power supply which provides 12VDC @ 500mA on a centre positive 2.1mm DC plug. An internal DC-DC converter generates a bipolar +/-15VDC supply within the unit.

**Guarantee:** The Spring Tanker comes with a 2 year 'reasonable' warranty. If any mechanical or electronic failure occurs within the period, I will repair the fault free of charge. This excludes failure from maltreatment or modification and any cosmetic degradation. Contact should first be made via email to discuss the problem. Shipping to return the device is paid by the user and I cover return shipping. Failures that are not covered by this guarantee may be fixed at standard rates.

**Enjoy!** Tom Bugs – April 2015 – [tom@bugbrand.co.uk](mailto:tom@bugbrand.co.uk) – [www.bugbrand.co.uk](http://www.bugbrand.co.uk)