Treadstone

desktop / module
user manual

Introduction

Congratulations on buying the Treadstone synthesiser. Treadstone is part of the Analogue Solutions range of analogue music equipment. Treadstone is a precision electronic musical instrument. It combines all the often needed music electronic circuitry to make a powerful music synthesiser in one compact module.

No compromise has been made with the construction of Treadstone. Cheaper parts have not been used.

- Full rugged steel/aluminium case - no plastic mouldings
- Good quality smooth, fully sealed against dust
- Good quality knobs with spun aluminium caps
- High grade double sided circuit board
- High Quality 16bit DAC for MIDI-CV conversion
- Stable MIDI to CV
- Analogue voice and modulation circuits
- Stable analogue oscillator
- Designed, built, tested and assembled in the UK
- True retro analogue voice and modulation circuits used in the synth element to give an authentic retro sound
- Real solid wood (not ply!)

WHY DO I NEED THIS SYNTH? WHAT'S SO SPECIAL?

Treadstone is a very compact true analogue mono synth in a neat, smart, small package.

When we say 'real analogue' we mean that the entire synth (apart from the post effects which are digital yet sound analogue) audio path and all modulation are all entirely analogue, using circuits based on awesome sounding vintage 1970s designs. The circuits are not locked down by CPUs. Controls are not quantised and read by CPUs. With the exception of the MIDI to CV circuit, which by its nature must have a digital element (and the digital echo of course), Treadstone really is analogue and the sound benefit is immediately apparent!

We get many good comments about how good Analogue Solutions products sound. How wonderful, warm and full of character they are.

The synth has been designed by Tom Carpenter, a musician and a big fan of electronic music. He knows how to program a synth and what should be expected. It was not designed by an engineer or steered by committee or men in suits. So, the modulation choices and range of sounds they produced have all been carefully thought out and quickly give you those sounds you want: huge bass, synth leads, percussion, effects, modular style sounds.

The synth is hand built with passion in England.

TREADSTONE CAN BE AS COMPLEX OR AS SIMPLE AS YOU WANT IT TO BE

We have given this synth a large and diverse number of controls, that along side the patch sockets, will give even the best and experienced synthesist endless possibilities.

But hopefully we have presented the controls in a user friendly and familiar monosynth layout that, together with this manual and other resources, enable even the new guy to get great sounds.

Treadstone Layout

Treadstone:

SYNTH – PERCUSSION – AUDIO PROCESSOR

Treadstone is a very compact full analogue synthesizer. Analogue - as in really analogue. The synth and modulation element are totally analogue using real transistors and op-amps. There are no CPU stabilised and quantised circuits, no DCOs, no digital LFOs and no digital EGs, as found on other so called analogue synths. The circuitry is based on designs dating back to the mid-1970s. So Treadstone has a genuine old sound.

Audio Applications

MONO SYNTHESISER

Treadstone is for use any time you need analogue sound effects, fat basses, screaming leads, beeps, tones, zaps, and all the other crazy sounds associated with analogue synthesis. Use in place of your boring digital synths and DSP soft synths.

EFFECTS PROCESSOR

Treadstone has an audio input socket, so you can feed external sounds through the on-board analogue filters for analogue processing.

DRUM SYNTHESISER

Treadstone is able to produce electronic percussion – kick, snare, hi-hats, cymbal, etc.

MODULAR SYNTHESISER

Treadstone is partially pre-patched but many of these patches can be cancelled using the switches and controls. It has such a wide range of modulation routing possibilities that it is almost as versatile as a full modular and can produce the same types of sounds, without the mess and confusion of cables. Even so, it has a large selection of patch sockets that enable you to re-patch itself, or, to connect it to an external modular.

MIDI (DAW Use) or CV & Gate?

This unit can be used with a MIDI keyboard (or DAW, or sequencer) or you can use it with an analogue sequencer, such as Oberkorn.

You can even use it just on its own using the internal MIDI loop sequencer.

It can also be used by MIDI and CV at the same time! So you could have an analogue step sequencer such as Oberkorn playing a little melody, then using a MIDI keyboard (or MIDI sequencer) transpose the Oberkorn sequence.

Circuits Included

Analogue Oscillator
The VCO is very analogue and uses discrete components and op-amps. One oscillator, yet is still sounds big - using PWM and Sub Osc creates a full warm and deep sound.

Analogue Low Frequency Oscillator
The LFO has triangle and square wave modulation signals.

Analogue Filter
Treadstone uses a four pole 24bB per octave multimode filter. The filter is a re-issue of the classic SSM2044, as used in many classic synths such as the Korg Poly 6, Monopoly, Emulator, SP1200.

Analogue Mixer
Audio signals such as the VCO, Noise, external audio are all routed to the VCF via an analogue mixer.

Analogue Amplifier
The VCA can be set so it is always 'open'. This allows Treadstone to be used as an effects processor.

Analogue Envelope
The EG features ATTACK, SUSTAIN, and combined DECAY/RELEASE. It's not really true to say it is an ASR envelope, it really is an ADSR - Decay and Release are both controlled by the same control. Saving space with little compromise in flexibility. It's possible to drone or auto-repeat the envelope also.

Modulation
Great thought has been placed into modulation route choices, allowing a wide range of sounds to be produced, including percussion and 'modular' style sounds.

MIDI

MIDI is intentionally kept simple – so you can concentrate on making new sounds and making music – not getting tied up with SYSEX programming.

In addition to pitch, trigger and MIDI clock, you get the all important control over filter cut-off using MIDI Velocity (or a MIDI controller).

'Patchable' External CV Control Sockets

Treadstone has many input and output audio and CV sockets - to allow the synth to be effectively re-wired to make new sounds.

The sockets also enable it to be easily used with Eurorack and other modular systems. They can be patched together.

MIDI Loop Sequencer

Treadstone features a simple, innovative and creative MIDI loop sequencer. A really simple way to input, edit and play up to 16 MIDI notes. A MIDI keyboard is needed to enter the notes. Or just take your chance and listen what's in there already!

A great tool for inspiration!

Safety Instructions

PLEASE READ CAREFULLY BEFORE USING:
- Only use the correct power adaptor.
- Never handle the adaptor with wet hands.
- Never excessively bend the adaptor cable or get it trapped or place heavy objects on it. If the adaptor cable becomes damaged, replace the adaptor.
- Ensure the unit is disconnected from the mains before moving or cleaning.
- Always disconnect the unit from the mains if there is lightning in your area.
- Ensure the unit is on a stable surface, and never place heavy objects on top of it.
- Never allow young children, hipsters or animals to operate the unit or adaptor.
- Do not use excessive force when using the controls or inserting cables to the connectors.
- The unit should not be operated in the rain, near water, or at a foam party, and should not be exposed to moisture.
- If the unit is brought from a cold environment to a warm one, the unit should be left to reach the ambient temperature.
- Keep away from heat sources, such as radiators, ovens, supernovae, heaters etc.
- Never allow it to get wet. Do not operate it near water, like pools, sinks, bathrooms etc. Oh, we covered that already.
- Do not place beverages on or near it.
- Do not eat humus.
- Never open the case or attempt to make repairs. Refer any servicing to qualified service personnel.

PREVENTING DAMAGE TO OTHER CONNECTED DEVICES

Treadstone has a very high dynamic range. It is capable of producing loud signals of very high and sub-sonic frequencies that could blow inadequate speakers if played too loud. It is recommended that input levels to external equipment (mixers, amp's etc.) are kept low when first connected, and then slowly increased to a useable level.

MAINTENANCE INSTRUCTIONS

Any cleaning of the Treadstone case should be done with a clean lint-free cloth.
DO NOT USE SOLVENTS OR CLEANERS, as this will deteriorate the exterior appearance of the equipment. Do not use a car wash or jet wash to clean this synth, and of course don't use a dishwasher or washing machine.

PLACE

Place Treadstone soundly on a stable surface so it cannot fall off or over, causing it or yourself injury.

POWER

The unit needs a regulated 12V DC supply, minimum 500mA.

TREADSTONE+

EG - Drone (up), LFO retrig (down)

EG -A (attack), S (sustain) D/R (decay / release)

LFO rate / speed

Sequencer manual step / advance

VCA Mode - modulated from Key Gate or EG

Echo dry / wet mix

Route some audio direct to VCA (post VCF)

Main audio out

All switches:
centre is 'off'

EG Trig in

EG signal out

Cut-Off CV mod,
Top via attenuator

Audio in to VCF &
Clock in to Sequencer

LFO outputs
triangle & square

VCO Square out

VCO PW CV in

Pitch CV mod,
Top via attenuator

Echo delay rate

Echo delay time

Cut-off mod by EG

Cut-Off mod by MIDI dynamics (velocity)

Add noise (left) or Sub Osc (right)

Waveform mix - saw / square

VCO tune

MIDI In (use adaptor)

PWM - EG (up), LFO (down)

Cut-Off

Resonance

Quick Start

Plus in the power, connect the audio out, patch LFO square wave out to MIDI Loop sequencer clock in!! And play!!!

The desktop and module versions have identical functionality.

POWER

Treadstone comes with a power supply. It uses a power supply with a regulated 12V DC output. Do not use PSUs with a lower or higher voltage. Use only regulated 12V DC. Centre is positive.

Plug the power lead into the rear of Treadstone.

Module: +12V 180mA (no -12V or 5V required). The module is polarity protected. But try and plug it in correct first time! It's good practise.
The red strip goes to the bottom pin.

MIDI

Treadstone has;

MIDI In - for sequencing from DAW or playing via MIDI keys.

Use the included mini jack to MIDI adaptor.

You can use a stereo jack lead to link this directly to some MIDI controllers like Arturia Beat Step or Key Step, without using a MIDI lead.

Do not patch any thing other than the MIDI adaptor into here. Nothing interesting or useful will happen.

Circuits in Detail

Here follows details on the sockets and controls, with brief simplified explanations of what the circuits do. We have not gone into technical details on how or exactly what each circuit does but tried to explain each control's function and effect.

This synth has been designed to be simple and intuitive to use, just like the original analogue synths of the 70s and 80s. There are no multi-layered menus to work through.

Anyone who has used synthesisers before should be familiar with the terms used and therefore be able to predict their behaviour and how they affect the sound. The best way to learn how to use Treadstone is to go straight ahead and play with it. Reading of this manual may only be necessary for finer operational detail.

There are many many web resources and books available if you need actual tuition or explanation of how functions like LFO, ADSR, etc work or can be used.

VCO - Voltage Controlled Oscillators

Treadstone has an analogue VCO. It produces the raw audio sound source for later processing.
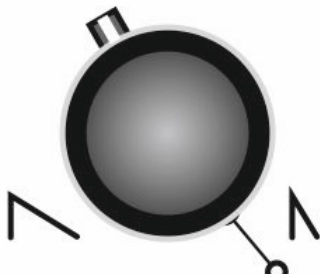
TUNE

Use this control to alter the pitch of the VCO.

PWM - Pulse Width Modulation switch

Use this switch to apply PWM to the square wave.

Up routes EG to modulate the PW.

Down routes LFO triangle to modulate the PW.

Centre turns off PWM.

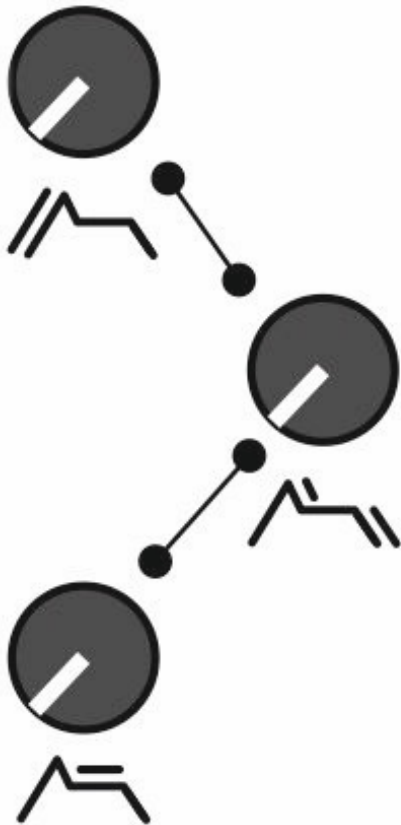Use PWM to thicken up the sounds.

LFO - Low Frequency Oscillator

Treadstone has an analogue LFO. It has Triangle and Square wave signals.

SPEED

This control alters the LFO speed / frequency.

Envelope Generator

Treadstone features an analogue EG. Although it appears as an ASR type envelope, the 'R' also adjusts 'D' (decay) so you can get pretty good full ADSR style shapes.

Attack

This alters the rise time of the Envelope.

Decay / Release

This alters the fall time of both Decay and Release.

Sustain

This alters the sustain level of the Envelope.

EG Retrigger / Drone

The EG can be re-triggered in 2 ways via the front panel switch.

DRONE - with the switch up the EG is held on as if a Gate signal is permanently there (or MIDI key held down) To fully appreciate the effect Sustain must be turned up, and the VCA Mode switch to the right (EG).

Off - put the switch to the centre position to turn retrigger/drone off.

LFO - with the switch down, the LFO will retrigger the EG causing a repeat effect. Ensure the VCA Mode switch is set to EG.

NOISE / SUB

NOISE

There is an analogue white noise generator.

Use this for effects, wind, noise, breathe sounds.

SUB

There is a Sub-Oscillator.

This is a square wave signal that derives its pitch from the VCO (it follows the same pitch as the VCO) and is one octave lower.

Typically used to thicken up the bottom end. Good for devastating bass sounds!

MIXER

Noise / Sub switch

Left routes white Noise to the mixer.
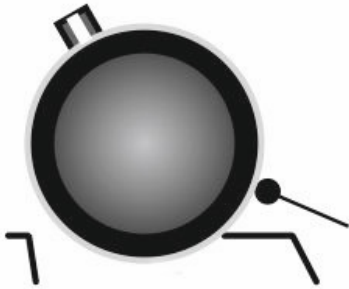
Right routes Sub-Osc to the mixer.

Centre is off.

Square / Sawtooth Level

Fully left gives you just Saw wave.

Fully right gives you just Square.

Somewhere in the middle you get a mix!

Filter

Treadstone has a 24db low pass SSM style filter.

Cut-off Frequency

Used to set the frequency cut-off. To get a good setting it must be **balanced** with the EG and Velocity mod controls (see below).

Resonance

Used to set the resonance / feedback level.
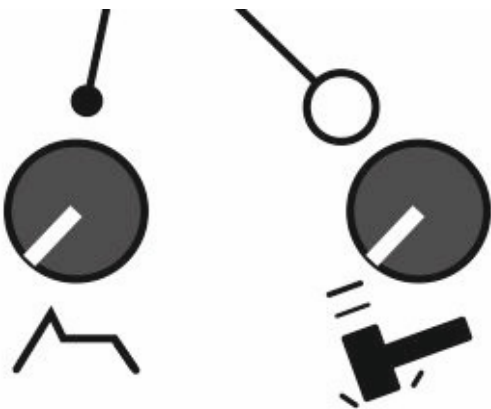
EG (left)

Use this control to set how much the Envelope will modulate the filter cut-off.

Velocity (right)

Use this control to set how much MIDI Velocity will modulate the filter cut-off.

Filtering External Sound Sources

External sound sources, such as vocals, guitars, mixer sends, samplers, etc. can be sent through the filter for extra treatment. Note, mic's and guitars may need pre•amping if the signal is too quiet.

Simply plug the sound source into one of the front panel mixer input socket.

Note: the Audio in shares an input channel to the filter with the audio from the Noise / Sub switch. You may want to centre this switch to Off to better hear external audio.

VCA

The VCA - this is an analogue circuit allows you to alter the audio level of the synthesizer. Typically the last circuit in the audio chain.

MODE switch

Switch left routes MIDI Gate to VCA level.

Switch right routes the Envelope to VCA level.

Centre is off! In this position you will get no audio output from Treadstone! (Except maybe the tail end of the echo.)

The switch needs to be set to EG (right) to hear various EG retrigger effects take place.

MIDI Receive Channel

MIDI receive channel is set to channel one and cannot be changed.

MIDI Loop Sequencer

Treadstone will always remember the last 16 events received. An event is a MIDI note (96 and 97 have special functions, see below).

Analogue Clock

When an analogue clock signal (for instance from the LFO square wave) is patched into the SEQ Clock input socket, the sequencer will play each note in turn each time a clock signal is received.

Short 5v gate type signals are ideal.

If you play any MIDI notes whilst the sequencer is running, the new note will over-write the current note, allowing you to change the pattern on the fly.

If you want to enter a specific sequencer of notes it is best done without clocking the sequencer. Use your MIDI keyboard enter a combination of 16 notes, rests and skips.

You can enter rests by playing note 97 (C# 7)

You can enter skips by playing note 96 (C 6)

- these notes will sound as you enter them on your MIDI keyboard.

So for instance, if you want just an 8 note pattern, program in 8 notes, then program in 8 skips.

Hopefully these two notes are nicely out of the way.

MIDI Clock

The sequencer will also run when receiving MIDI clock.

Turn MIDI clock transmit OFF on your External MIDI sequencer / DAW if you do not want the Treadstone sequencer to run, and just play using MIDI notes.
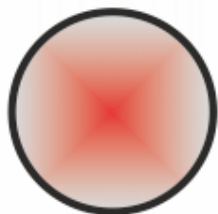
When using MIDI sync, you will need to set the VCA Mode switch to EG (right) ideally due to the way internal analogue gate signals are generated.

Turn Off MIDI Clock Receive

Push the switch found on the under side, through the hole using a non metallic stick like a cocktail stick.

Pushing this switch toggles on / off MIDI clock receive.

Advance

Each time you press Advance, the internal MIDI loop sequencer will advance to the next step and pitch will change to the new value.

The Advance switch has a built in LED that represents LFO speed.

Echo

Treadstone features a lo-fi digital echo.

The left control alters delay time.
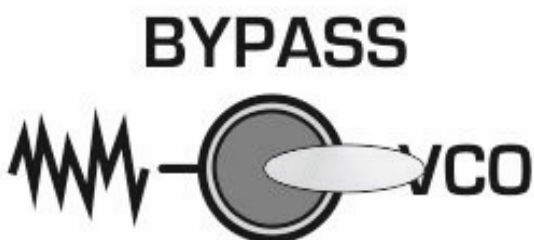
The centre control alters delay repeat.

The far right control alters echo / dry mix level.

BYPASS

Bypass allows some VCO or Noise audio to be sent direct to the VCA, post-VCF. Ie un-filtered and raw.
Use to beef up or anger the sound.

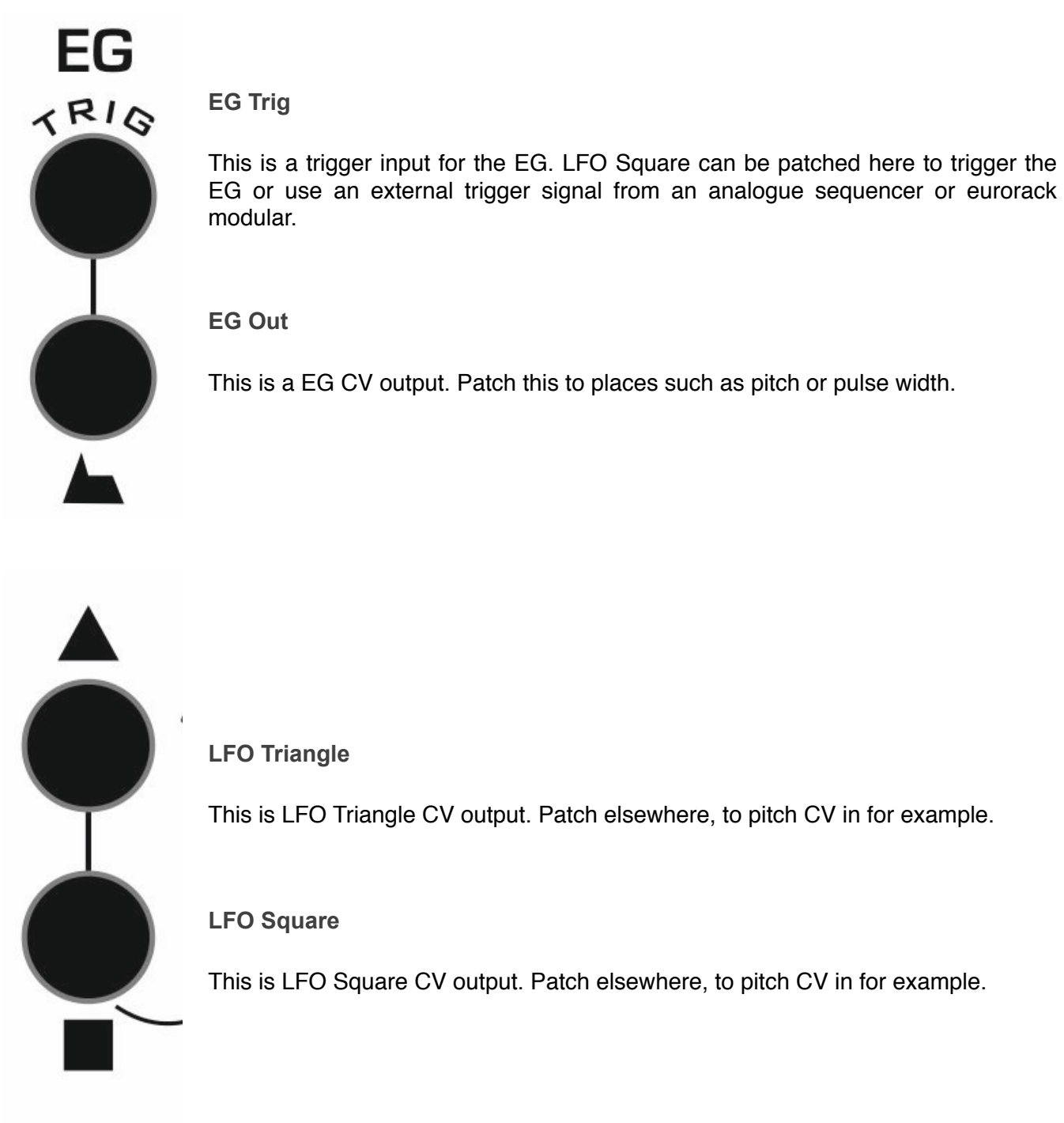You'll hear the effect better if the main audio is filtered (cut off low.)
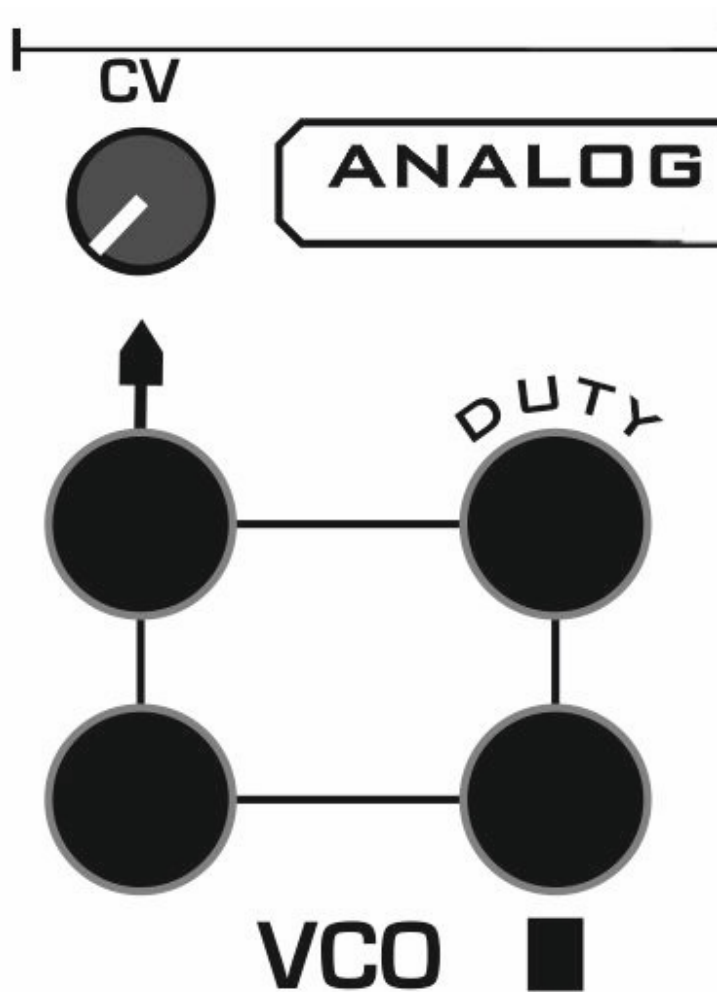

Left is Noise

Centre is Off

Right is VCO Saw wave.

Patch Sockets

Treadstone features a generous array of eurorack style patch sockets the allow you to further extend the range of sounds possible by doing some simple patches.

EG Trig

This is a trigger input for the EG. LFO Square can be patched here to trigger the EG or use an external trigger signal from an analogue sequencer or eurorack modular.

EG Out

This is a EG CV output. Patch this to places such as pitch or pulse width.

LFO Triangle

This is LFO Triangle CV output. Patch elsewhere, to pitch CV in for example.

LFO Square

This is LFO Square CV output. Patch elsewhere, to pitch CV in for example.

VCO Sockets

The pitch can be controlled by two external CVs. These are the left two sockets. The top left one also has an attenuator control.

DUTY - This CV input is used to modulate the pulse width of the VCO square wave.

Bottom right is a square wave audio output. A good patch is to connect this to the filter cut-off. Ensure resonance is at or near maximum!
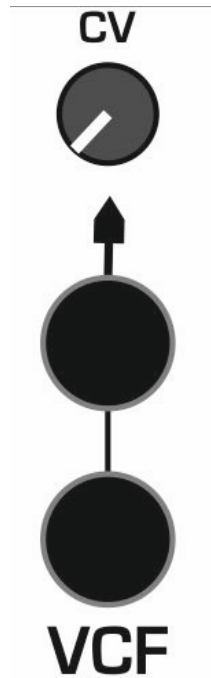
VCF CV

There are two external CV inputs to control the filter cutoff.

The top one also has an attenuator control.

CV signals such as the LFO can be patched here for filter modulation effects.

Audio Out

This is the main audio output of the synth. Connect this to your external mixer or DAW audio interface.

Patch Examples

Over the next few pages are some cool and essential patch examples. These show some physical patches you can do with patch cables to create additional new sounds. The patches don't show control positions - so play around here. These are just meant to give you ideas or show you new things.

You can combined these patches together also.
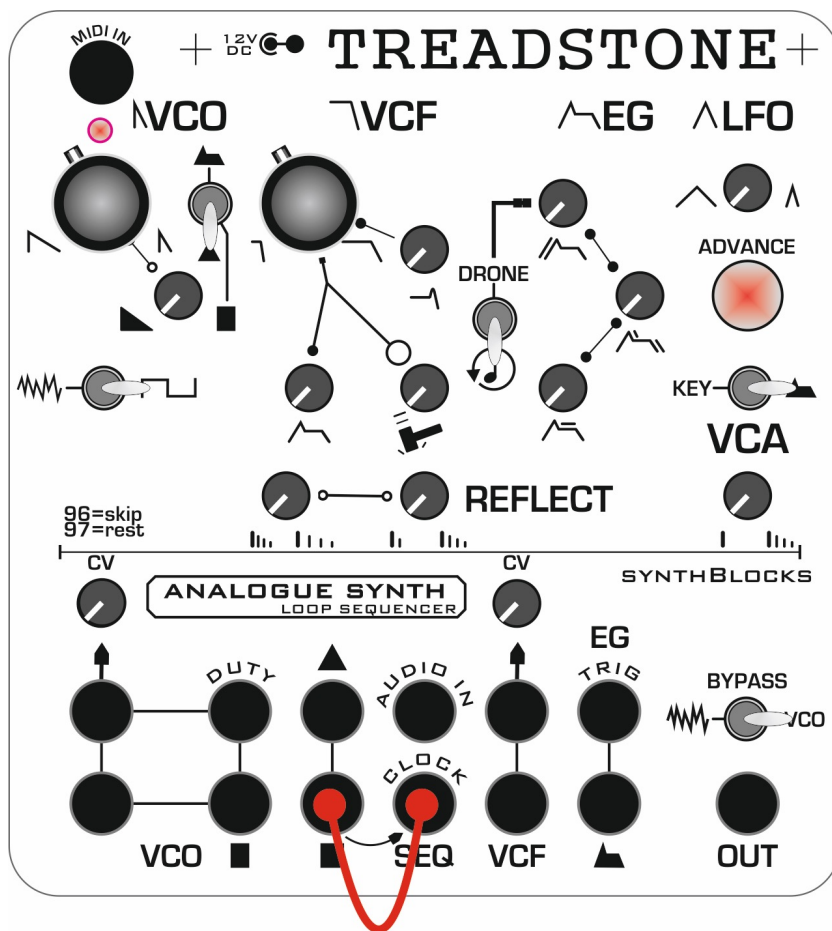
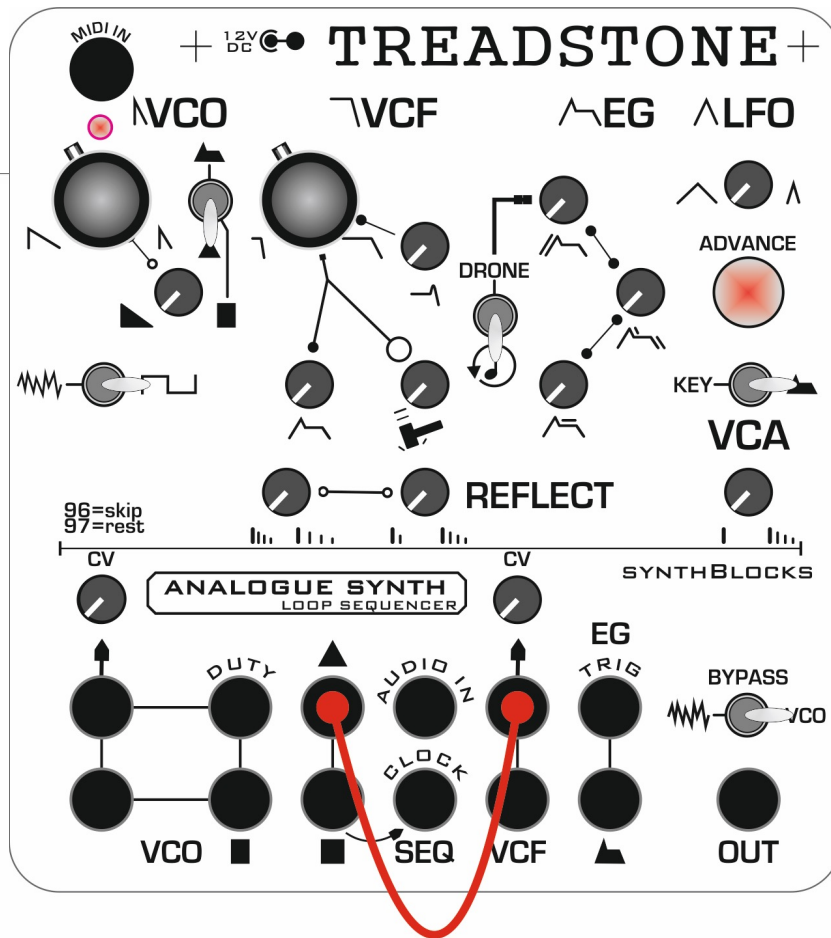Clocking the Sequencer - using the LFO to clock the internal sequencer.
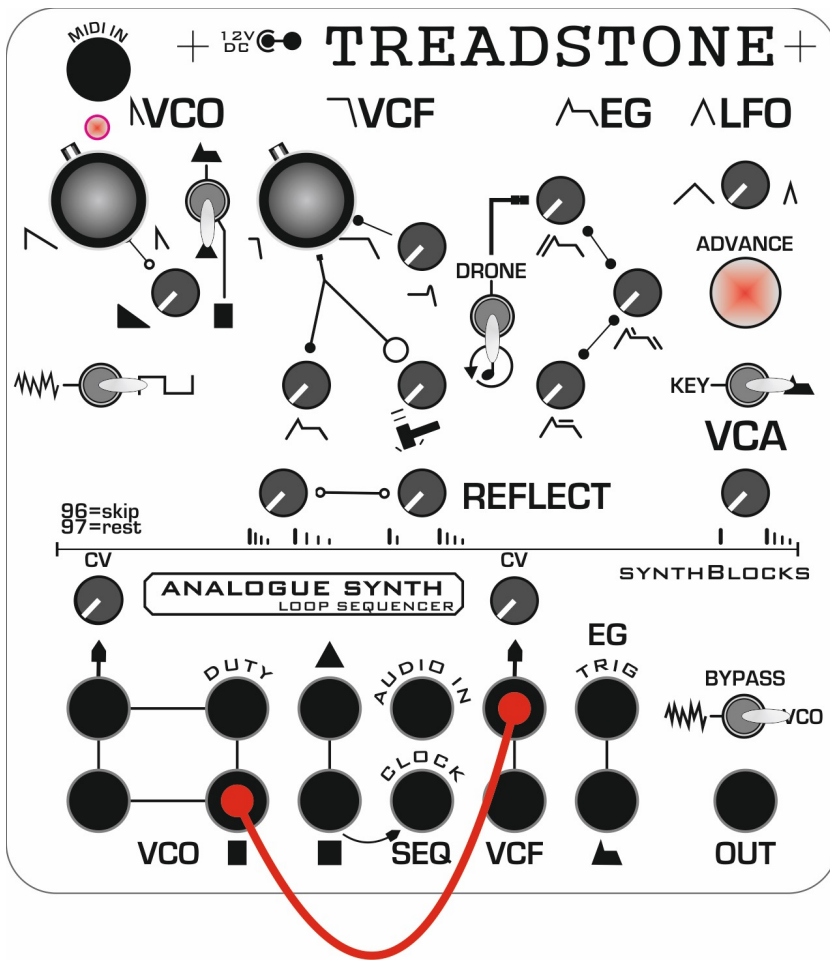
VCF Cross Mod - Use the VCO audio out to modulate the filter cut-off.
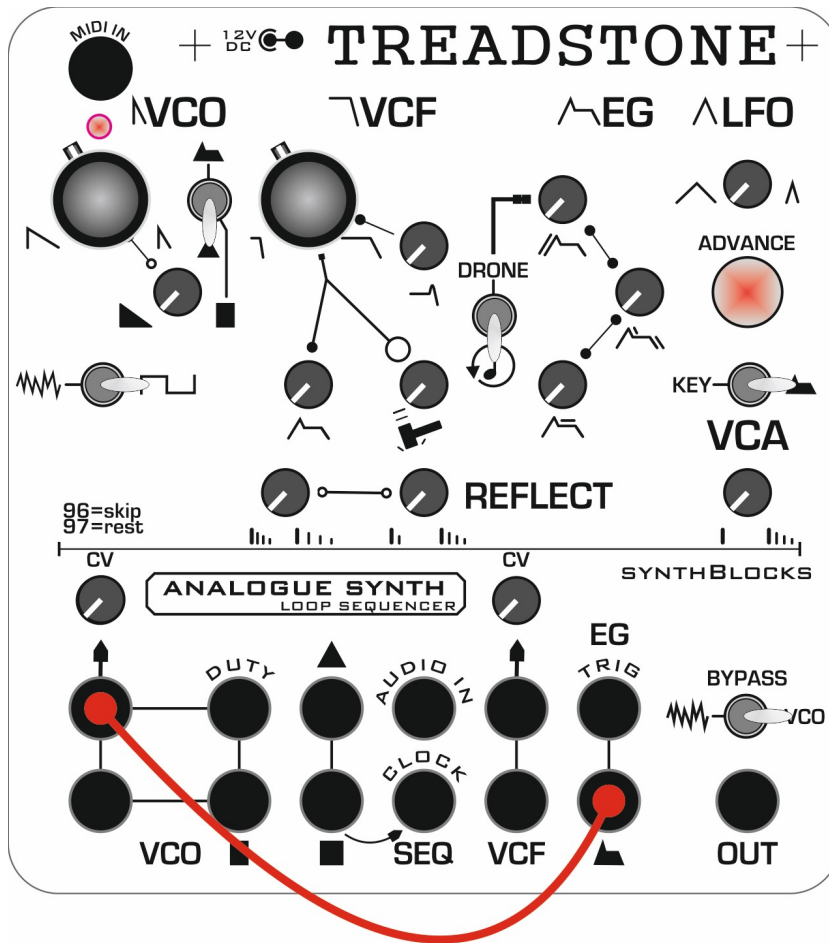
Notes:

Turn VCF CV Mod attenuator to maximum. Turn Resonance to maximum.

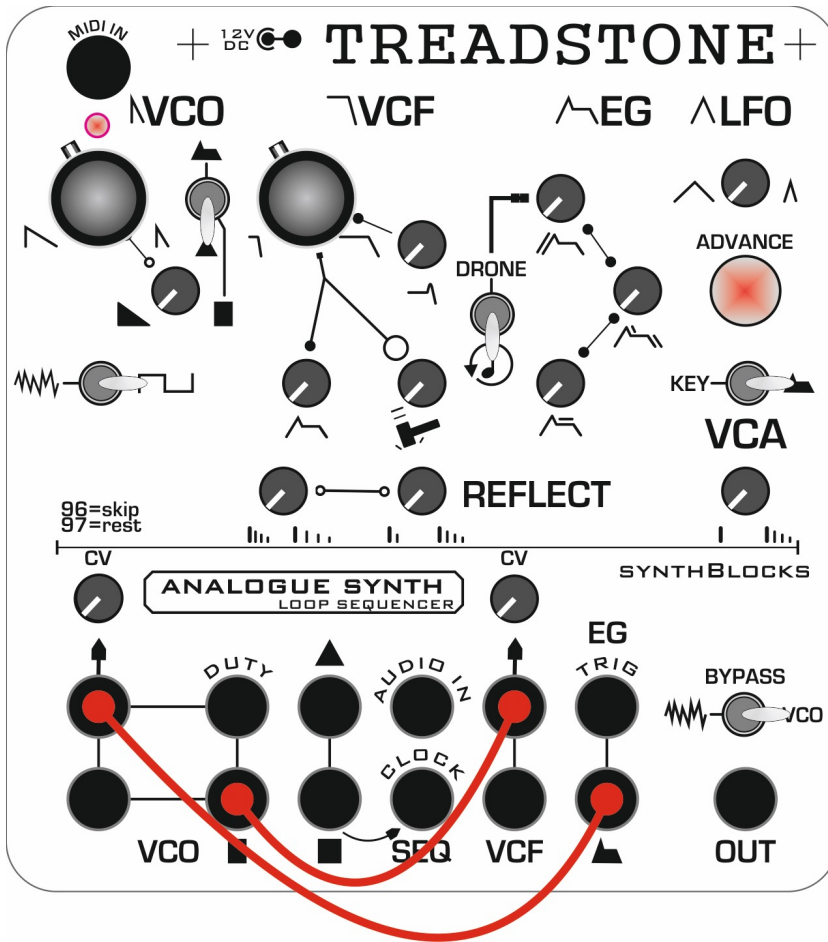Play around with pitch, pulse width, filter cut off to change the effect.

Filter Cut Off Modulation - using the LFO triangle to modulate the filter cut off.

Adjust the cut off mod attenuator to vary the intensity.

Pitch Sweep - patch EG CV out to Pitch CV in. Adjust the pitch CV mod attenuator to vary the effect. Good for percussive sounds.
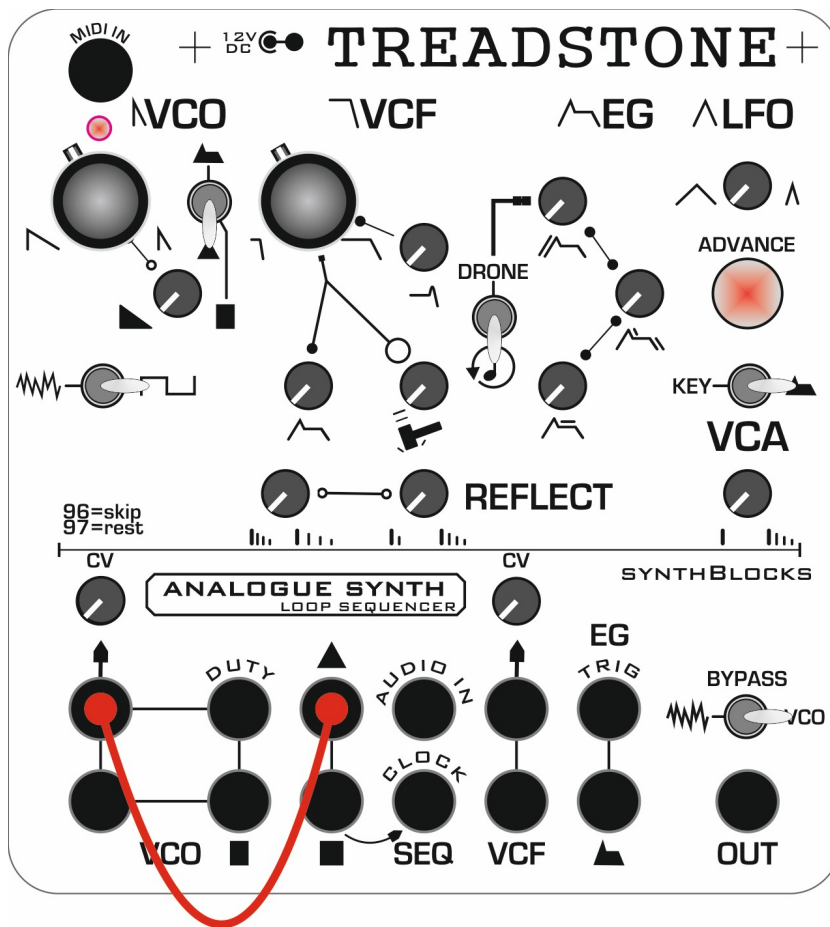
Filter Cross Mod and Pitch Sweep.

This is a combination of two patches covered earlier.

Patch VCO Audio out to filter cut-off (the centre cable).

Patch EG out to Pitch in.

Try some settings suggested in the earlier patches.

Play around!

Vibrato - patch LFO Triangle output to pitch CV input. Adjust the pitch mod attenuator to vary the effect.

No Signal?

There are many settings that can kill the sound!

INCLUDING THE VCA MODE switch, which in the centre position, will mute the sound.

Other general things-

Do you have audio going into the synth's mixer?
Is your MIDI connected correctly?
Are you triggering the EGs correctly?
Main volume up?
Leads all OK (double check! Assume nothing. Leads do fail)?

Check the following…

• Your mixing desk / monitoring equipment is on and working correctly.
• Check the synth is switched on and that the power adaptor is functioning correctly. Check you are using the correct mains adaptor.
• Check it is connected to your monitoring equipment correctly and that the cable is not faulty.
• Ensure the output volume is high enough.
• Ensure the Treadstone mixer level controls are turned to some sound source like the VCOs or Noise.
• Certain extreme filter settings may filter out all of the signal or produce low level signals. Try adjusting the filter cut-off.
• Certain extreme PW/PWM settings may cause the pulse outputs to cut-out. Try adjusting PW/PWM as necessary.
• Ensure EG is being triggered.
• Ensure the VCA switch is not in the centre position.

Don't instantly assume the synth is at fault - we have had dozens of instances where problems turn out to be faulty and intermittent leads, incorrect settings in DAW and audio cards, mixer busses set wrong etc. We have heard all manor of crazy and silly mistakes.

You can always plug the VCO output directly into your external audio mixer (watch levels aren't too high!) and this will give you confidence power is OK.

Specification

Weight:

420g

Size:

Desktop:
134 x 125 x 52mm

Module:
22HP
22mm Depth

Power:

Desktop:
regulated 12V DC output
2.1mm plug
300mA

Module:
+12V 180mA (no -12V or 5V required).

All jack sockets are 3.5mm mono, unbalanced.

The MIDI In jack requires a special DIN to jack adaptor. One is included.

Warranty

Treadstone comes with a 1 year (from purchase date) back to base warranty, (i.e. customer must arrange and pay for carriage to and from Analogue Solutions or the dealer from which purchased).

This warranty shall not apply where the product has been subject to alteration, misuse accident, neglect (such as extremes of temperature and/or moisture) or to wear resulting from normal use.

At the sole discretion of Analogue Solutions, the warranty is deemed to be void should the unit be or considered to have been opened or any other modifications or tampering be carried out by unauthorised parties.

CE COMPLIANCE
This unit complies with EU Directives 73/23/EEC and 89/336/EEC.
Standards: EN55103-1, EN55103-2, EN60065

CE