1. Introduction

Module **A-148 (Dual S&H)** has two identical sample & hold modules, designed to produce 'staircase' voltages.
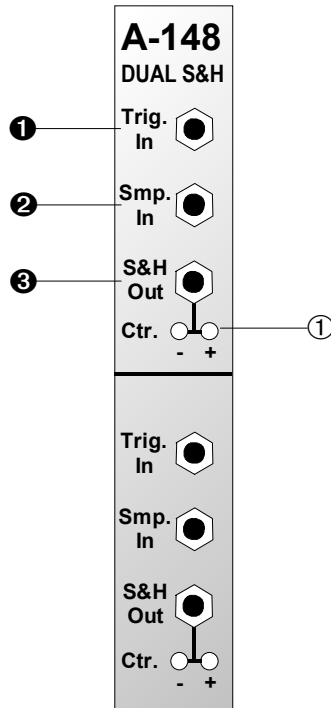
The signal present at the **sample input** (voltage range -8V...+8V) is sampled at a rate set by the signal at the **trigger input**, and held at that voltage at the S&H output.

The exact shape of the staircase depends on the sort of waveform at the sample input: NOISE or RANDOM signals produce random patterns; an LFO produces rising or falling staircase patterns.

Two **LEDs** for each S&H indicate the voltage (positive or negative) of the sampled signal.

From August 2005 an improved version of the module is manufactured: For each sub-module the operation mode **S&H** (sample&hold) or **T&H** (track&hold) can be selected by a jumper. In T&H mode the output signal follows the input signal while the trigger input is "high". As soon as the trigger input turns to "low" the last voltage is stored. The factory setting is S&H for the upper device and T&H for the lower device. In addition the complete A-100 voltage range -12...+12V can be processed (no longer limited to -8...+8V as for the previous version).

A-148
DUAL S&H

Trig. In

Smp. In

Control

S&H Out

Trig. In

Smp. In

Control

S&H Out

2. Overview

A-148

DUAL S&H

❶ — Trig. In ●

❷ — Smp. In ●

❸ — S&H Out ●

Ctr. ○—○ — ①

- +

Trig. In ●

Smp. In ●

S&H Out ●

Ctr. ○—○

- +

Indicators:

① **LEDs**:   sampled voltage status indicators

In / Outputs:

❶ **Trig In** :   Input for trigger signal

❷ **Smp In** :   Input for signal to be sampled

❸ **S&H Out** :   Output for sampled (and held) voltage

3. Indicators

① **LEDs**

These LEDs give a visual indication of the voltage level of the sampled and held signal (**- LED**: negative voltages, **+ LED**: positive voltages).

4. In / Outputs

❶ **Trig In**

The trigger input signal decides the rate at which the sampling takes place. Triggering takes place at the leading edge of the waveform (see arrows in Fig. 1), so the width of the pulse isn't important.
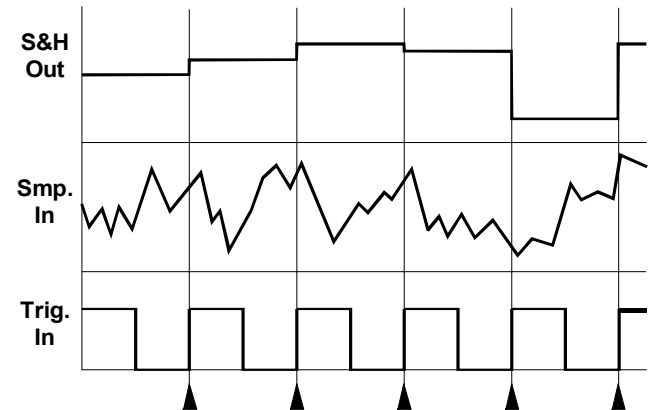
❷ **Smp. In**

Socket ❷ is the **sample input,** where the signal to be sampled is patched in. For the old version (manufactured until August 2005) the signal fed into this socket has to be in the range -8V...+8V. For voltages beyond this range the S&H function will not work any longer. But the module cannot be destroyed as long as the voltage is in the range -12V...+12V. And that is the maximum voltage output from any A-100 module. Consequently within the A-100 no damage is possible.

For the new version of the module manufactured from August 2005 the complete A-100 voltage range can be processed (i.e. -12...+12V).

❸ **S&H Out**

The 'sampled and held' voltage is available at the **S&H output** (see Fig. 1).

Fig. 1:   S&H module signal diagram

5. User examples

Random arpeggios

In the example in Fig. 2, an A-118 is used in conjunction with the A-148 to produce random voltages from the random output of the A-118. An LFO triggers the S&H module, so that with every oscillation of the LFO a new random voltage is output to the VCO's CV input.

If you patch an A-130 VCA in before the VCO, you can adjust the Gain and Out amounts to restrict the frequency range of the random voltages to whatever you want.
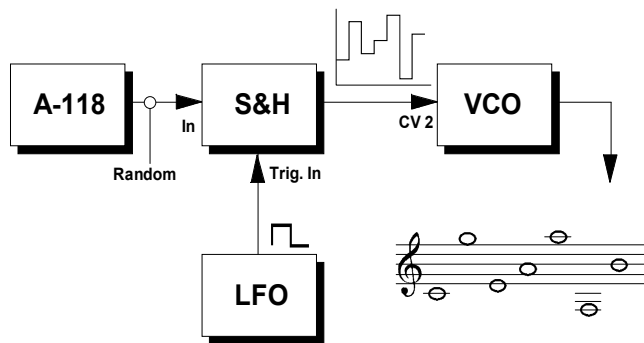
You can use the same basic set-up as in Fig. 2, but patch the S & H voltage output to the CV input of a filter set to high resonance, for some interesting rhythmic timbral changes (see page 6).

Glissando

In Fig. 3 an A-148 produces a **staircase voltage.**
The pitch CV output from a keyboard is patched into an A-170 Slew Limiter. An A-148 triggered by the rising edge of an LFO samples the output from the slew limiter, and produces a staircase voltage which in turn controls a VCO's pitch.
Playing two notes, particularly widely spaced ones, produces interesting glissandi.

☞   It's important to adjust the slew limiter's time setting and the LFO's frequency to achieve the right speed and number of notes in the glissandi.
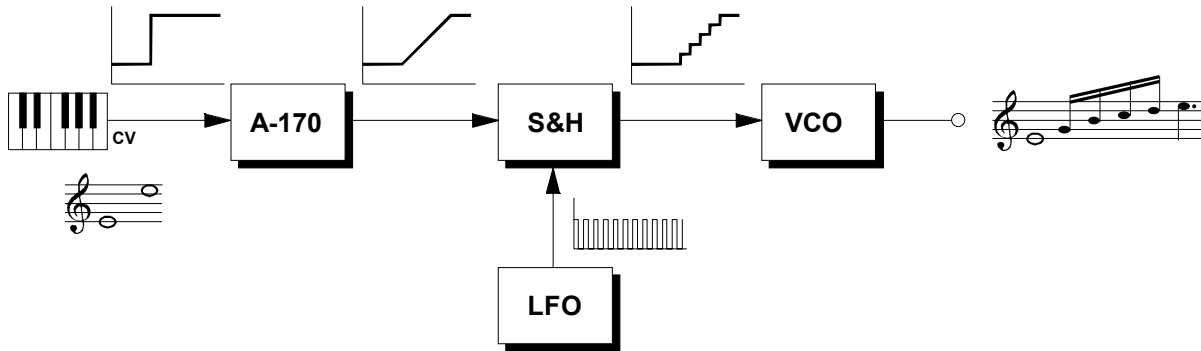

Fig. 2: Random arpeggios

Abb. 3: Glissando

If you like you can patch the gate signal to the reset input of the LFO, so that its waveform starts at the beginning for each note.

Instead of an LFO, you can also use the MIDI-Clock from a MIDI-CV interface. That will produce glissandi synced to MIDI.

Random filter settings per note

With the patch in Fig. 4, every time a keyboard gate voltage is received, a new random filter CV is sent out. For best results, adjust the **resonance** to a **high** setting.
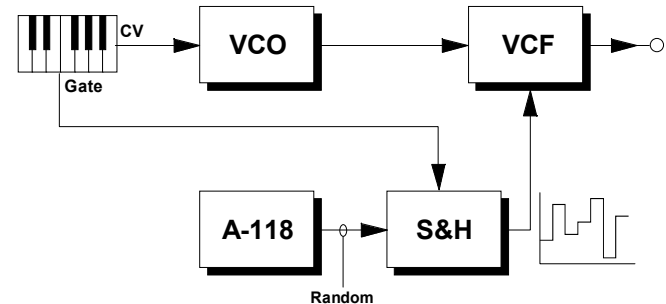

Fig. 4: keyboard gate triggering random filter settings

6. Function of the jumpers
(only for the new version manufactured from 2005)

By means of the jumpers JP2 and JP3 the operation mode can be chosen (S&H or T&H).

The factory setting is S&H for the upper device and T&H for the lower device.