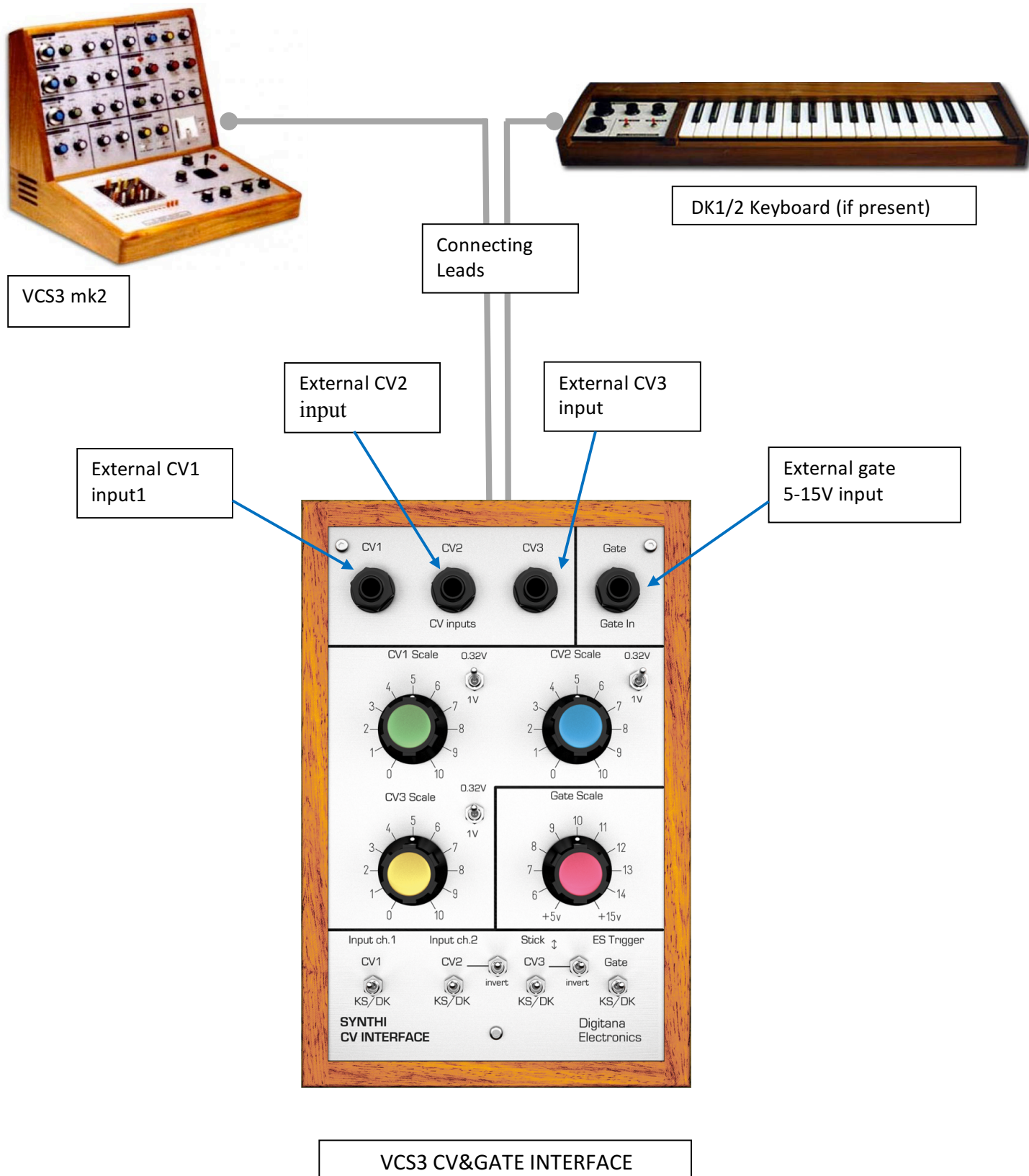


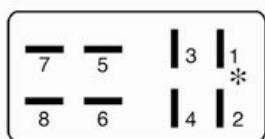
SYNTHI VCS3 CV & GATE INTERFACE

Instruction Manual



Instructions for using the Synthi VCS3 CV & Gate Interface

Use of this unit is pretty straightforward. The VCS3 (mk2) has actually 3 input channels accessible from the 8 pin 'Jones' keyboard connector, as well as access to the Envelope Shaper(ES) trigger.



Rear of male or female 8-way Jones connector on VCS3 (mk2)

Pin 1 – Input Ch1
Pin 2 – -9v
Pin 3 – Ground
Pin 4 – +12v
Pin 5 – ES trigger
Pin 6 – Input Ch2
Pin 7 – Meter
Pin 8 – Matrix row 16
(seq) **VCS3 (mk2) ONLY**

Note on VCS3 (mk1), pin 8 of the Jones connector is not connected to any row of the matrix, so a special pin cable is used for the VCS3 (mk1) CV & Gate interface to allow CV3 to be inserted into any matrix column. The following features although written with a VCS3 (mk2) in mind equally apply for the VCS3 (mk1).

The 3 input channels to the Matrix are Input Ch1, Input Ch2 and Matrix row 16 (with Joystick vertical control range knob set to the 'seq' position) and Pin 5 is the ES trigger.

The 3 toggle switches on the unit allow switching of the CV inputs CV1-CV3 or the standard DK connections into Pin 1, Pin 6 (if a DK keyboard is connected).

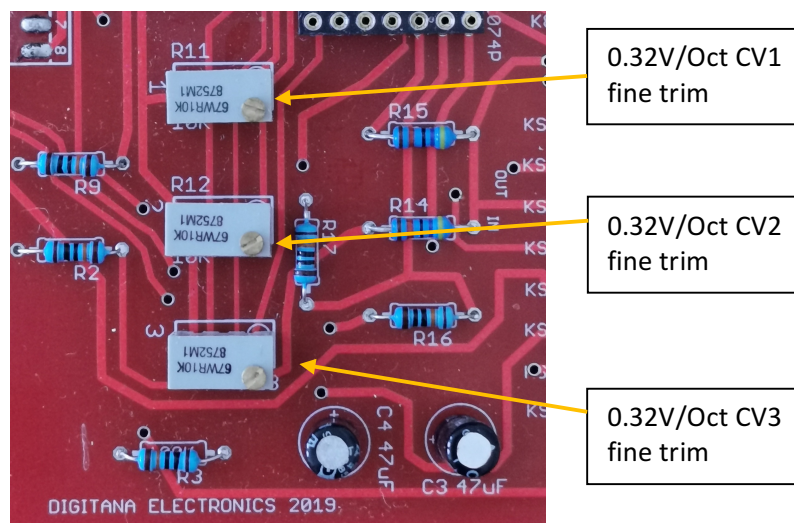
Precision multi-turn trimmers for fine tuning of 0.32V/Oct scaling of CV1-CV3

You will notice 3 toggle switches that switch between '0.32V/Oct' and '1V/Oct' settings. The purpose of these switches is to change the range of the 3 cv scaling pots for CV1-CV3. In the 1V/Oct setting, setting a pot to max (10) will feed an external CV into the VCS3 input channels without any scaling. So if the external CV is pitch CV scaled at 1V/Oct, it will remain so when reaching the VCS3.

However, the two main audio oscillators of all VCS3 (Osc1 and Osc2) are calibrated at 0.32V/Oct (!). In order for external CV of 1V/Oct to play chromatic pitches on these oscillators, the voltage has to be scaled quite precisely to match this. This is why the other toggle switch settings is '0.32V/Oct'. This is the setting to use (with scaling pots set to max 10) if you want e.g. to play chromatic pitched sequences that come from an external sequencer, midi cv etc which is calibrated at the more standard 1V/Oct.

On the main pcb inside the unit you will find 3 multi-turn trimmers (shown in the photo below). These are used to calibrate the 0.32V/Oct scaling precisely, one each of CV1-CV3.

Each can be adjusted by inserting a small flat head screwdriver.



Access to the pcb is by removing the back cover of the wood case. Unscrew the 4 rubber feet and remove the cover.

By default, the trimmers are adjusted so that when CV1-CV3 pots are set at 10 on the front of the unit AND the 3 toggle switches are set to 0.32V/Oct, then pitch CV1-CV3 are scaled at 0.32V/Oct.

Calibration of these trimmers used my own VCS3 (mk2). However, it is unlikely that any two Synthi's will have Osc1 and Osc2 with exactly the same scaling. Indeed, even on the same Synthi you may find that Osc1 and Osc2 may not even scale precisely the same (unless it has been recently serviced). Such variations are to be expected in something that is almost 40 years old!

Luckily having 3 independent scaling trimmers as discussed, above allows you to get around any such variations and get perfect chromatic scaling over several octaves.

If you find that your VCS3 sounds out of tune when you patch e.g. CV1 to Osc1 and CV2 to Osc2 freq. control using matrix patch pins then do the following calibration.

Osc1/CV1 calibration

Make sure the VCS3 is warmed up first (at least 15mins)

Set Input ch1 pot on the VCS3 to max 10 and Osc1 frequency vernier dial to some suitable value. Set up the following patch:

		SIGNALS							CONTROLS									
		output ch 1	output ch 2	meter	trapezoid	envelope	ring mod	reverb	filter	osc. freq.			decay	reverb mix	filter freq	out-put ch level		
										A	B	1				2	3	1
output ch 1																		1
output ch 2																		2
oscillator 1		●																3
oscillator 2																		4
oscillator 3		⌋																5
noise																		6
input ch	1																	7
filter	2																	8
trapezoid																		9
env. signal																		10
ring mod																		11
reverb																		12
stick																		13
	↔																	14
	↑↓																	15
																		16
																		A
																		B
																		C
																		D
																		E
																		F
																		G
																		H
																		I
																		J
																		K
																		L
																		M
																		N
																		O
																		P

(nb: it is important that you use the precision red ems pins for patching cv to Osc freq control in carrying out the calibration procedure. There is too much variation in the standard (white, yellow etc) pins resistance to make them reliable for chromatic frequency control.)

Set the CV1 scale pot to 10 on the CV &Gate Unit and the toggle switch to 0.32V/Oct range.

Set the lower toggle switch to the CV1 setting. Via your external 1V/Oct sequencer play a sequence of keys/notes at different octaves. If the notes sound flat/sharp...make small adjustments to the **first** of the rear trimmers labelled CV1 with a small screwdriver. You should hear the pitches of the notes played change. Doing this you can trim the 0.32V/Oct setting of CV1 to match the scaling of VCS3 Osc1 so it tracks chromatically over several octaves.

The trimmer calibration needs only doing once...basically set and forget. Then each time you use the VCS3, (having waited for it to warm up), you will find that setting Input ch1 pot to 10 on the VCS3, CV1 toggle to the 0.32V/Oct setting, CV1 scaling pot set at 10, you will be guaranteed chromatic pitches on Osc1.

Osc2/CV2 calibration

Apply the same procedure as above to CV2 and Osc2. The patch will now be as above but the black pin connects Osc2 out to Output ch1 and the red precision pin connects Input Ch2 to Osc2 frequency control. Adjust trimmer marked CV2 on the rear of the unit.

Again, make sure Input ch2 level pot is set at 10 on the VCS3 and CV2 scale pot set to 10 on the unit and the toggle switch set to 0.32V/Oct range during calibration

The fine tuning of CV3 scaling is less critical unless you intend on using CV3 to act as pitch CV for controlling Osc3 in the audio range. Note Osc3 in the Synthesizer is not (by design) tracking at 0.32V/Oct but at 0.26V/Oct (!) so you will need to adjust the **third** trimmer on the rear of the unit rather more than for CV1 and CV2 to get the scaling down to 0.26V/Oct. Other than this the procedure is as above but the patch should now take Osc3 to e.g. Output Ch1 and CV3 to Osc3 freq. control. which is achieved by inserting a red precision pin to connect row 16 (stick vertical CV) to Osc3 freq control input and also making sure you have rotated and 'clicked' off the stick vertical scaling pot on the VCS3. This turns row 16 into the third input channel where CV3 emerges into the matrix.

In the case of a VCS3 (mk1), you insert the pin of the special pin cable into Osc3 freq control column on the matrix. This pin carries CV3, because as mentioned earlier, a VCS3 (mk1) (or a Synthesizer A) does not have the feature that matrix row 16 'doubles' as a sequencer CV input, as on the Synthesizer AKS/VCS3(mk2). So, use of a special pin cable is the only way of getting 3 channels of CV into a mk1 Synthesizer.

Finally, to use CV3 as pitch CV, you will have to have the inverter toggle switch in the 'invert' position. Otherwise you will find Osc3 plays 'backwards', i.e. playing a higher pitched note via the external sequencer (hence a larger positive CV3 voltage if it's standard 1V/Oct type) generates a lower sounding note (and vice-versa). The reason is a bit technical but it's to do with the fact that all 3 Synthesizer oscillators actually track using a negative CV (NOT Positive CV which is the norm for most other Synthesizers). Since Input Ch1/2 have amplifiers that invert voltages fed into them (they are inverting amplifiers) positive midi-generated CV1 and CV2 get inverted to negative CV by them. But row 16 (the third Input channel) has no such amplifier, so does not invert, hence the reason why I designed the unit to allow inverting of CV3!

It is also possible to invert the DK1/2 voltage on Input Ch2 which is a useful additional feature.

The Synthesizer was designed so that the ES is triggered by a positive voltage around 4-5v. The Gate scale pot allows larger voltages to trigger the ES safely up to a maximum of +15v. Many hardware external sequencers produce various trigger voltages so the gate scaling pot can be adjusted to accommodate any gate range between +5 to +15v. By adjusting this pot, you can also get different gate times eg if your gate voltage is +5v, adjusting the pot to higher values will result in shorter and shorter gate times until finally the ES will not trigger.