

## The VCS3 Card for 208

Hi

Thank you very much and congrats on your purchase of the VCS3 Card.

This card expands the Music Easel or 208 with original EMS VCS3 circuits : an **oscillator** that produces simultaneous square and triangle waveshapes with wide range from very slow LFO to ultrasonic and features useful modifications (synchronization, shape CV, hi/lo range) and a **noise generator** with variable colour, together with the acclaimed Portabellabz **random voltage generator** modification module that expands many original EMS Synthi A, AKS and VCS3.

The inputs and outputs voltages are adapted to match the ones used in the 208.

### Oscillator

**hi/lo switch** : selects the oscillator frequency range

**key switch** : sends CV patched to the 208's keyboard voltage input, typically from a 218 keyboard, tracking is calibrated to the user's preference and is good on about 5 octave with minimal drift. The oscillator needs about 10 minutes to warm up and stabilize. Calibration was done with the frequency pot in central position (C), other setting might affect the tracking range.

**frequency top pot** : sets the oscillator frequency.

**frequency bottom pot** : sends CV patched to the card's "freq" black banana socket, it's an attenuverter, 0 is the central position, CW is normal CV, CCW is inverted CV.

**fine pot** : fine tunes the oscillator frequency.

**shape top pot** : sets the oscillator waveshapes, affects both square and triangle together, in central position, the waveforms are symmetrical, fully CW or CCW mutes the square, this is normal behaviour.

**shape bottom pot** : sends CV patched to the card's "shape" black banana socket, it's an attenuator, CCW is 0, CW is maximum.

**square and triangle level pots** : waveform level sent to the mixer.

**sync pots** : sends signal patched to the card's "sync" black banana socket to slave the card's oscillator, it's an attenuator, CCW is 0, CW is maximum. This oscillator's sync is far more tonally versatile than any other analogue synthesizer commercially available. Typical master is the 208's MO via its "mod CV out" socket, the envelope and pulser in fast self mode work as well, the CO is a great master, a dedicated pre-LPG output is possible thanks to a small modification of the 208 detailed in the VCS3 Card build notes available on my website.

### Noise and random voltage generators

**colour pot** : sets the noise colour, CCW promotes low frequencies, CW high frequencies, the pot setting affects the random voltage output.

**level pot** : noise level sent to the mixer.

**noise / random mini slide switch** : behind the panel, next to the white banana socket, selects between noise and random voltage on the white banana, this affects this output only and the noise is still available in the mixer when switched to random.

**208's inverter "to prog" or "to card" socket** : random voltage generator clock input, it won't work if no clock signal is patched to this input.

*The noise generator needs about 30 seconds to start working, no sound or random voltage immediately after power up is normal behaviour.*

**square and triangle blue bananas** : full range modulation outputs of the oscillator.

**white banana** : modulation output of the noise and random voltage generators.

**red banana** : modulation output of the mixer.

**tinijax** : audio output of the mixer, to be patched into the 208's preamp "signal in" tinijax.

**black bananas** : CV inputs to the oscillator, as described above.

### Internal presets

These presets were carefully adjusted for best performance.

Except the panel "key in" which may need a slight adjustment depending on the keyboard used, none of these presets should be modified.

**audio out** : sets the master level of the tinijax output, adjust it with the mixer pots fully CW to have the same amplitude as the MO square when the gain switch is in its central position, comparison can be done with the routing switch. If there's distortion or the gain switch doesn't seem to change level, reduce the master level.

**noise** : sets the noise output, adjust it to have the wider range and maximum level without distortion or leakage.

**tracking** : sets the oscillator tracking.

**frequency** : sets the oscillator frequency.

**key in** : next to the key switch, trims the keyboard CV, like the 208's "(trim)".

**shape (optional)** : adjust the oscillator waveshapes

**shape lo (optional)** : adjusts the oscillator waveshapes in lo range

## Recommendations, tips and disclaimer

Ensure that the Easel or 208 is powered off before inserting or removing the card into the program card slot. Do not insert it backwards.

The card warms up in the bottom left and top right corners, this is normal behaviour. To reduce action and pressure on the 208's edge connector, hold the card with a hand when you patch or unpatch a cable, this connector is solid but not as strong as a module screwed on a boat and you don't want to damage it.

Although 100% safe with any 208, the 218e and any other 200e modules could be damaged if you send an audio signal or a negative CV to a CV or pulse input banana. The VCS3 Card outputs negative CV and audio signal, therefore **do not patch** its outputs to a 200e module.

The keyboard CV and random clock inputs don't work if the control switch is set to "local" or "front panel". It should be in the central "both" position.

In early BEMI Music Easels the weak internal PSU may have issues powering another expansion card together with the VCS3 Card via the rear edge connector, a passive 208 Hub or a card doubler, or even the VCS3 Card on its own. Common symptoms of a weak PSU are the envelope looper not working (on the 208 or on the 208 ToolBox) and the 208 oscillators pitch changing when the card is inserted. A powered 208 Hub is the easiest solution to connect cards without extra load on the Easel's PSU but is a bit overkill to connect one card only. Another solution is an extra dedicated PSU inside the Easel, this upgrade is documented in the build notes available on [portabellabz.be](http://portabellabz.be).

With the BEMI / Buchla USA 218e keyboard, a tuning and tracking shift of the CO and MO may occur when the VCS3 Card's "key" switch is on. The cause is the 218e's "main" output is not buffered. A very simple reversible mod of the 218e fixes this and is documented in the build notes available on [portabellabz.be](http://portabellabz.be).

If your VCS3 Card doesn't seem to output audio with your Buchla USA Music Easel or Easel Command, the audio cable is very likely the culprit : the tinijax cables that come with these units are the cheaper Black Market types, not the quality Buchla brand, and don't do good contact in the tinijax socket. Several users reported issues with these. The solution is to use another cable. Good tinijax cables are available from <https://www.samodular.com/product/tinijax-cable/>. You can also try with a minijack cable, some work in tinijax sockets, others don't.

The noise may seem a bit low in volume. In fact its audible level depends much on the LPG setting. The 208 preamp level can be increased with the gain switch and the VCS3 Card's oscillator outputs lowered to get the desired noise level.

I assume no liability for personal injury or damage to equipment or loss of use caused directly or indirectly by the use of the VCS3 Card. Feel free to contact me for questions, feedback and support.

The VCS3 Card is manufactured under EMS Cornwall Licence.

Thank you and have fun !  
Cheers and beers from Belgium,  
Constantin

## OVERVIEW

The Portabellabz Synthi Card expands the Buchla Easel's functionality by providing an oscillator based on EMS Synti circuitry. The card provides 5-octave tracking triangle and square waves plus selectable noise color, fed into a mono output mixer. The card is complemented with random voltage generation and modulation outputs for the oscillator waves and mixer in a compact package.

**KEY SWITCH** input is typically taken from a 218 keyboard, tracking is calibrated to the user's preference and is good on about 5 octaves with minimal drift. The oscillator requires about 10 minutes to warm up and stabilize. Calibration was done with the frequency pot in central position (C), other settings might affect the tracking range.

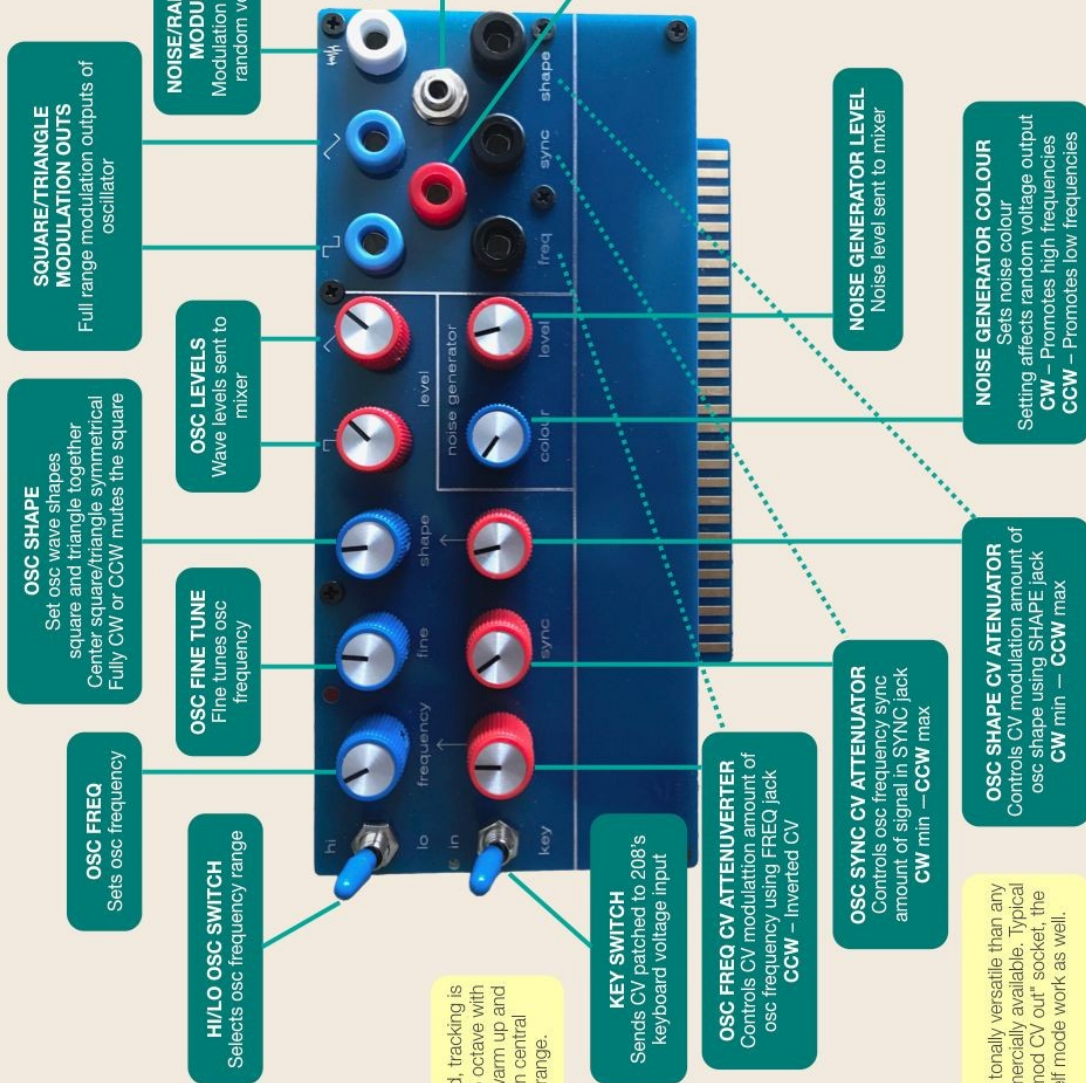
## RECOMMENDATIONS

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The card warms up in the bottom left and top right corners, this is normal behaviour.

To reduce action and pressure on the 208's edge connector, hold the card with a hand when you patch or unpatch a cable, this connector is solid but not as strong as a module screwed on a board and you don't want to damage it.

This oscillator's **Sync** is far more tonally versatile than any other analogue synthesizer commercially available. Typical master is the 208's MO via its "mod CV out" socket, the envelope and pulser in fast self mode work as well.



**OSC FREQ**  
Sets osc frequency

**HI/O OSC SWITCH**  
Selects osc frequency range

**OSC FINE TUNE**  
Fine tunes osc frequency

**OSC SHAPE**  
Set osc wave shapes  
square and triangle together  
Center square/triangle symmetrical  
Fully CW or CCW mutes the square

**OSC LEVELS**  
Wave levels sent to mixer

**SQUARE/TRIANGLE MODULATION OUTS**  
Full range modulation outputs of oscillator

**Noise Generator** requires about 30 secs to start working, no sound or random voltage available immediately after power up

**NOISE/RANDOM VOLTAGE MODULATION OUT**  
Modulation output of noise or random voltage generator

**208 INVERTER** "To Prog" OR "To Card", JACK  
Random voltage generator clock input

**NOISE/RANDOM MINI SWITCH**  
(behind panel next to white jack)  
Affects white jack output only, noise always available at mixer output  
**TOP** – Selects noise  
**BOTTOM** – Selects random voltage

**MIXER AUDIO OUT**  
Audio output of mixer  
(To be patched to 208 Preamp Signal In)

**MIXER MODULATION OUT**  
Modulation output of mixer

**KEY SWITCH**  
Sends CV patched to 208's keyboard voltage input

**OSC FREQ CV ATTENUVERTER**  
Controls CV modulation amount of osc frequency using FREQ jack  
CCW – Inverted CV

**OSC SYNC CV ATTENUATOR**  
Controls osc frequency, sync amount of signal in SYNC jack  
CW min – CCW max

**OSC SHAPE CV ATTENUATOR**  
Controls CV modulation amount of osc shape using SHAPE jack  
CW min – CCW max

**NOISE GENERATOR LEVEL**  
Noise level sent to mixer

**NOISE GENERATOR COLOUR**  
Sets noise colour  
Setting affects random voltage output  
CW – Promotes high frequencies  
CCW – Promotes low frequencies

## INTERNAL PRESETS

**AUDIO OUT** — Sets the master level of the linjax output, adjust it with the mixer pots fully CW to have the same amplitude as the MO square when the gain switch is in its central position, comparison can be done with the routing switch. If there's distortion or the gain switch doesn't seem to change level, reduce the master level.

**NOISE** — Sets the noise output, adjust it to have the wider range and maximum level without distortion or leakage.

**TRACKING** — Sets the oscillator tracking.

**FREQUENCY** — Sets the oscillator frequency.

**KEY IN** — Next to the key switch, trims the keyboard CV, like the 208's "trim".

