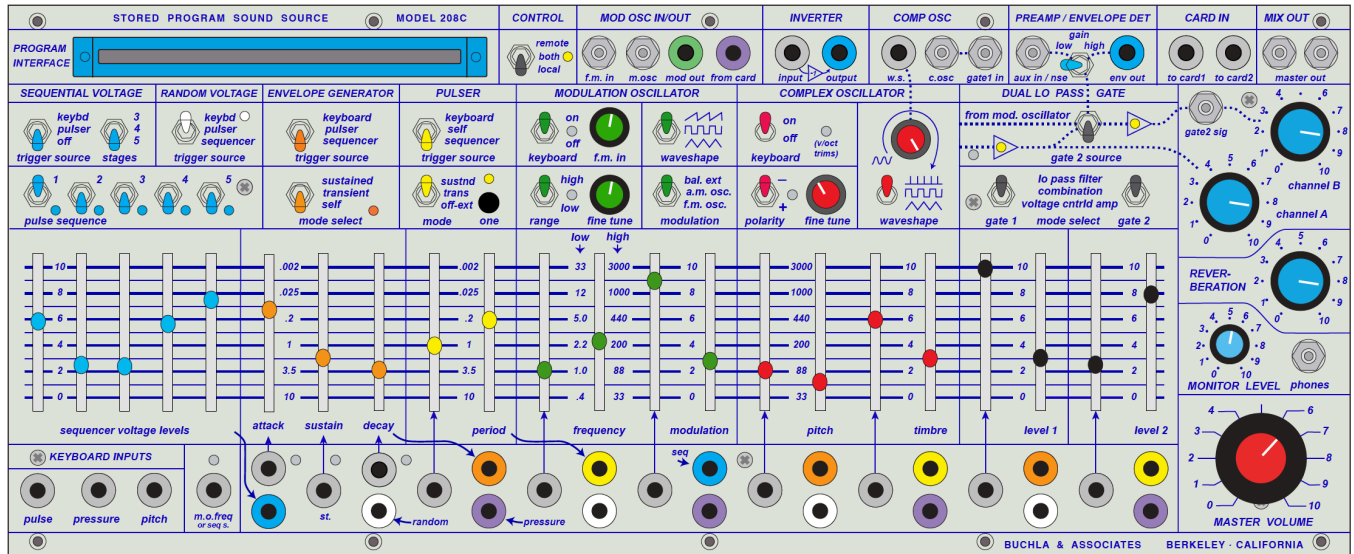


208 Manual: 208C Addendum v0.0

by Joel Davel 1/27/2020

Congratulations!!!! With the 208C you've acquired all the original power and analog goodness of the original 208 in a redesign that gives you more inputs and outputs and with room for some upgrades. The first thing you'll notice that is different from the original 208 is the front panel.



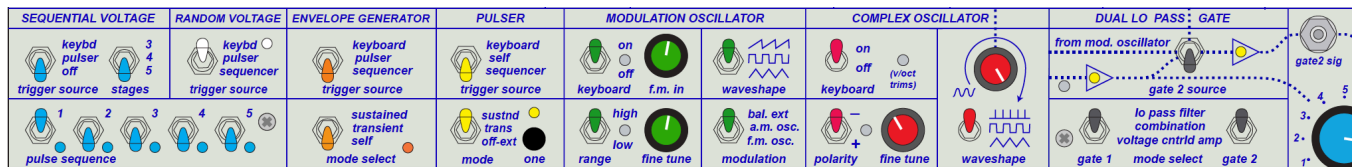
What's new:

Starting from the top moving left to right:



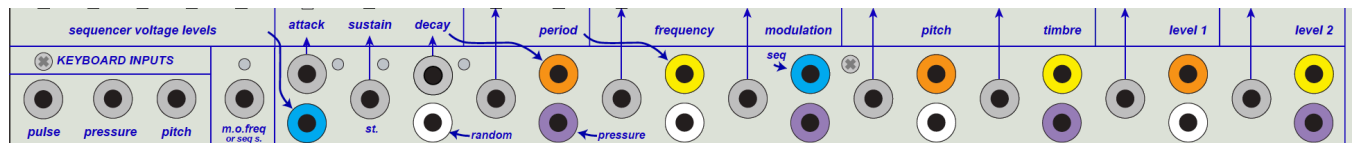
- 1) **Control indicator:** Simply an LED that indicates when it is powered and what mode it is in for quicker recognition. When the LED is red, remote mode, this is a good warning that the front panel (local mode) is disabled.
- 2) **FM input** to the modulation oscillator: With high range introduced to the 208 on the 2013, it made sense to add a simple 200-series style frequency modulation input to add more character and cross modulation possibilities to this audible range oscillator.
- 3) A **modulation oscillator** direct audio output is added, the modulation oscillators CV output has been moved to a logical location on the panel, and the introduction of green follows through on giving each section its own unique associated color.
- 4) The **waveshape knob** now has a CV input that will sum with the knob position. If the waveshape knob is fully counter-clockwise, a 0v-10v input will have same effect as turning the knob fully. Note that if the knob is NOT fully counter-clockwise, the sum will add to, but not be limited to, the normal excursion of the knob. This over-excursion has the effect of simply adding additional gain and eventually mixing in more of the fundamental sine wave. It could be used for amplitude modulation, but beware of clipping.
- 5) The **complex oscillator** has a direct audio output.
- 6) The **gate 1** input has a direct input that is "normalled" to the complex oscillator output. If another signal is inserted into this jack, it will replace the complex oscillator connection.
- 7) The **preamp** is normalled to **white noise**. If a cable is inserted into the **aux in** jack, its signal will replace the noise. (Use LPG mode of gate 2 to filtering effects for the noise.)
- 8) The card1, card2, and master outputs have moved to a more logical location on the panel. Note that the panel layout still allows for shorting bars between CV inputs and outputs in three locations in the top area.

What's new in the switch area:



- 1) The random switch has moved from the lower area to make room for more CV inputs below. This also consolidates the trigger source selections to the same panel area.
- 2) There are more inputs to the **Pulser's mode**.
 - The “one” switch replaces the previous toggle-down function of the switch.
 - The pulser can now be in either transient or sustain mode.
 - The off-ext position will allow the period CV input to be used as a pulse input. (This is further explained below**)
- 3) There are more **v/oct trims**. The volts-per-octave trims that trim up the keyboard inputs now have a range that allows trimming for 1v/oct or 1.2v/octave inputs. They should be trimmed to 1.2v/octave from the factory per the Buchla standard. And now there are also trims for the two faders that open up the frequency and pitch CV inputs for the individual oscillators. With those faders at full, the trims inputs can be turned all the way down to get the historical 2v/octave input or all the way up to 1v/octave. The default setting is approximately 1.2v/octave but can be fine tuned with the fader.
- 4) The panel graphics for the waveshapes harken back to the original 1974 208 waveshapes. (If comparing with the earlier 208's, the waveshapes are more balanced in output volume with the sine wave than before as well.)
- 5) Gate 1 has a trim. Please leave this at the default gain unless you are using external inputs to gate1 that typically exceed 14volts peak to peak and would therefore be clipped.
- 6) Gate 2 has a direct audio output for independent use of this gate.

What's new in the bottom CV input area:



- 1) The **pressure** input is a true input. (It was a bus on the earlier 208's.) That allows its black banana input to sum with other pressure inputs, such as from an internal 208MIDI daughter card, and then appear out the purple output jacks as expected. (Output will be limited to approximately 11v when summing.)
- 2) A new “**m.o.freq**” input with a trim. This trim has a wide range and can be adjust from 10v/octave to 1v/octave. It re-establishes a shorting bar distance connection from the sequencer to the modulation oscillator that was in the 1974 208 and provide another independent input to the modulation oscillator. Because there is already two 1.2v/octave inputs to the oscillator via the direct CV input and the keyboard input, this may be trimmed to 8v/octave to go with the sequencer. Note that all CV inputs to frequency will sum.
- 3) A secondary label of “**or seq s.**”: Because this is already a 3rd frequency CV input, there are two other switchable options to use this input for the sequencer instead. It can be switched to control the number of stages in the sequencer or can be switched to function as a trigger source for pulse inputs when the sequencer is in the “off” position. See. Section on switch and jumpers.
- 4) **Attack, sustain and decay CV inputs**. Trims will be set for 50% by default, but users may trim as desired from full range to none.
- 5) **Pulse input to the pulser** via the period CV.** To get an independent pulse input to the pulser externally put the pulser in the “off-ext” position. The period CV control banana input will then connect through the fader to the pulser trigger source. If the fader is down, it will have no effect. If the fader is on full it will act like a pulser in sustain mode. If the fader is partially up it will trigger in either transient

mode or exhibit more interesting unusual and sometimes doubled triggering behavior, if for instance driven by the EG in self mode.

*A note about CV control of switches: In local mode, CV input used to control these switch makes the switch move virtually up from it's panel position. To get all selections of the switch, move the switch you are controlling to it's lowest position. For instance, to control the sequencer stages, set the set switch at "5" and you will get all four selections. (above "3" stages with more current is a 2 stages selection not on the panel. The # of stages will decrease as the CV increases. This why the "# of stages" numbers are arranged in this order just as the EG faders make the speed go faster. This has to do with the underlying circuit control.

One exception to this switch control rule: When the Envelope Generator is in "self" mode on the panel, the EG cannot be controlled remotely from EITHER local OR remote mode.

What's new with the connectors:

- 1) A **factory tank mount and standard RCA connections to the spring reverb** allow users and service departments to simply swap out the reverb in seconds if there is any damage to the reverb.
- 2) A **208MIDI daughter card connector**: Your 208C may come preinstalled with a 208MIDI daughtercard to allow you to control the 208C via MIDI input from either DIN, USB, or USB host inputs. These digital inputs are turned into the most common analog control signals.
- 3) The **program card headers** have changed. The change to standard IDC headers allows for easier signal distribution and future program card development. It has all the same historic signal control for CV inputs and switch positions found in all 208's including, of course, those signals added in 2013.***
- 4) There is a **stereo reverb daughtercard connector**. This daughter card connection is in a format that allowed for a 3rd party digital reverb to be used in place of the monophonic spring reverb. A Buchla branded reverb will become available.

Thoughts on the use of daughtercards:

The planned daughtercards all use digital circuitry. As digital electronics evolves, having plug-in cards allows for future development and card replacement. And if choosing not to use daughter cards, analog purists can also have a 208 that is unadulterated, and will -- with care and maintenance -- hopefully last over 45 years like the 1974 208's still working today with or without its digital controls. It would be wonderful if instruments like this can be passed on to new curious generations.

This section is for advanced users. Please get to know the instrument before considering the options below:

Advanced options settable from the PCB side.

Because many 208 users are very individual, there are some options available on the underside/the PCB side for users. The first one is moderately straight-forward.

- 1) As mentioned above, the m.o.freq CV input can be switched to control the number of stages in the sequencer or can be switched to function as a sequencer source for pulse inputs when the sequencer is in the "off" position. This should be self-explanatory. The switch is immediately under the jack and is labeled appropriately.
- 2) There is a 2-pin header named H29 (and also labelled "SUS CV-STAGE#" on Rev8.) If H49 is jumpered/shorted, the "st." labeled sustain banana input will also control the number of sequencer stages. Many people like how controlling the stages with random voltages gives you a lot of variation in the sequencer. The input will control both sustain and "stages" unless the sustain trim is turned fully down. Using this jumper allows the m.o.freq banana input to be used for it's other two functions.
- 3) There is a switch for reverb selection for either the spring reverb or a potential stereo daughtercard reverb. (If set incorrectly, turning up the reverb will fade out the master output)
- 4) There is a Hi Gain trim from the preamp: The preamp has lo – middle – high gain switch settings. To increase or decrease the high gain, use this trimmer through the hole and below the reverb cable shield. (For Rev7 this may have some effect on the low gain as well.) This allows small output signal like pickups to be amplified more than previous 208's.
- 5) The "P-CAL" trim for the Pulser: This trim is not new, but the range is new. Trims on the PCB/bottom side should be left alone, but users may consider adjusting the period calibration if they are using an old program card preset that expected a faster or slower setting. For instance, if you would like to calibrate to match the fader's front panel graphics, a 90% turn will better match these listed period numbers. This large white trim is accessible with the reverb mounted.

*** In "Meta-Programming" for the original program card, all five stages are mentioned as solder-able -- programmable in value -- with a resistor. But since Rev5 of the 208 (and often modified in Rev4), the Sequencer 5 stage has been replaced by a local enable signal by default in order to signal to the card when the control switch is in "both" mode. This never affected iProgramCard users. This only affects users who program the sequencers with resistors using the original Program Cards. For those who would rather get that signal back, it is assumed they are already familiar with soldering. On the 208C program card PCB they can cut the trace (below "E") between the square via and "ENLOC" and solder a wire from that square via to SQ5B1. It can be restored by returning the connection with a wire between that square pin and ENLOC. Note however that in both historic manual examples, stage 5 is left open/unconnected anyway.

There are a few hidden hacks that I expect may be shared in shadowy underground communities. But note that anyone who dares to change the attack, sustain, decay, and m.o.freq trims to pots in the provided unstuffed footprints will void the warranty and likely make your panel very ugly. Don't dislike ugly panels.