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The 208 ToolBox

Hi

Thank you very much and congrats for purchasing the 208 ToolBox.
You'll definitely enjoy how it expands your Music Easel or 208 clone.

To get familiar with how the CV of the various parameters works it's good to start with the 208's related sliders and switches in their lowest position.
The amplitude of the CV controlling the CO waveshape and envelope times have attenuators allowing to scale the CV.

Modulation Oscillator

The MO frequency switch transposes the MO to a higher or lower range, each range can be set accurately thanks to the 2 multiturn trimpots accessible via the small holes to the left.
Central position is the normal unmodified MO range.

The MO waveshape banana socket is a CV input to the MO waveshape switch, it works like switching, the change is not progressive.

Complex Oscillator

The CO waveshape banana socket is a CV input to the CO waveshape switch, it works like switching, the change is not progressive.

The banana socket and pot to the right are a CV input to the waveshape's amplitude.

Pulse Sequence

The "stages" switch affects the Sequential Voltage Source stages number : CV via the banana socket or 2 stages.

The "all" banana socket outputs pulses related to the 208's Sequential Voltage Source switches position. These are short pulses.
The "1 2 3 4 5" banana sockets output a dedicated pulse for each stage. These are like gates, the signal sent has the duration of the stage.

Random

The "rand" banana socket is a pulse input to clock the Random Voltage.

Envelope generator

The envelope sliders and switch on the ToolBox are NOT an extra envelope but control the 208's envelope.

The 3 sliders and related banana sockets are CV inputs to the envelope times.

The envelope looper sends a pulse and retrigs the envelope at the end of its decay phase when the switch is in its lowest position. The LED shows the retrig pulse and still works when the looper is not active so you can anticipate its retrig time.
Thanks to the "self" knob the retrig time can be delayed up to about 7 seconds.
The envelope needs an initial pulse to start looping, if the envelope generator is off it won't loop on it's own when switched.

The banana socket above the switch can be either a CV input to the delay time or a pulse input to trig the envelope generator, depending on the position of the mini slide switch accessible behind the panel.
If your ToolBox has a dedicated envelope generator pulse in as an option, this switch is not present and the banana socket is hard wired to the CV position.

The 208's panel "sustained/transient" switch works with the 208's "keyboard pulse" input only and won't work with the pulses sent via the ToolBox.
The ToolBox's envelope generator pulse in features a special gate to trigger converter circuit making it work in transient mode, i.e. the duration time is not related to the pulse length.

CV Mixer

This is a 3 inputs CV mixer, input 1 has an attenuator (CCW mutes the CV and CW is full CV), inputs 2 and 3 have an attenuverter (CCW is full inverted CV, centre mutes the CV, CW is full CV). The latest revision features only 2 inputs both with attenuverter, the 3rd input is an optional feature,
The LED displays the output levels.

Rear edge connector

A program card can be plugged into this connector which is connected in parallel with the 208's one.
BEMI iProgram Card and Aux Card can be plugged this way as well, but you want to support it with something placed below because of the weight which might damage the connector on the long term.

Optional features

Various extra features are possible thanks to the 3 top left corner emplacements and the 2 "to prog" banana sockets on the 208's panel.
These are implemented on demand and were discussed when you ordered your ToolBox.

Any wiring can be easily modified. The edge connector pinout is on page 3 (some NC contacts are used on the BEMI Easel, these connections are not in the list).
The Easel manual's Meta-Programming section will give you useful indications on the resistors values, for CV inputs you want to select on test the one which best suits your own needs.

The envelope looper pulse delay pot can be wired in 2 ways to have shorter delay time CW or CCW. CCW seems the most logical wiring but CW matches the other envelope times as these are shorter with the slider higher. This can be changed thanks to the 2 jumper bridges located below the pot and accessible if the rear panel is removed.

Recommendations and disclaimer

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

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

Some features depend on the 208's "control" switch setting. If something doesn't seem to work, check that this switch is well in the "both" central position.

Each ToolBox is carefully tested and will work with original B&A 208, 208r rev2 clone and BEMI 208. It doesn't work with 208r rev1 clone, do not attempt, this might damage the ToolBox or the 208r rev1.

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 ToolBox's CV mixer and BOB expander's envelope inverter are able to output negative CV therefore do not patch these to a 200e module.
A schottky diode added in series with the 218e or other 200e module's input bananas is a straightforward easy to DIY protection from accidental negative CV / audio patching.

I assume no liability for personal injury or damage to equipment or loss of use caused directly or indirectly by the use of the ToolBox.

Edge connector pinout

Front	**Rear**
1 : +15V	1 : -15V
2 : 0V	2 : NC
3 : NC	3 : NC (+5V on BEMI 208)
4 : NC	4 : NC
5 : NC	5 : NC
6 : NC	6 : NC
7 : seq step 1 out	7 : seq step 2 out
8 : seq step 3 out	8 : random 1 out
9 : seq step 4 out	9 : pulser period CV in
10 : seq step 5 out	10 : MO index CV in
11 : seq steps #	11 : MO freq CV in
12 : seq pulse setting	12 : sequencer pulse in
13 : seq CV setting	13 : CO pitch CV in
14 : random pulse in	14 : keyboard pulse out
15 : seq CV out	15 : keyboard key CV out
16 : random 2 out	16 : pulser pulse in
17 : EG pulse in	17 : timbre CV in
18 : pulser pulse out	18 : attack CV in
19 : duration CV in	19 : keyboard pressure CV out
20 : pulser out	20 : EG CV out
21 : decay CV in	21 : sequencer pulse out
22 : LPG1 level CV in	22 : MO modulation switch CV in
23 : MO ws CV in	23 : inverter "to prog"
24 : CO & MO key	24 : CO waveshape pot CV in
25 : LPG2 level CV in	25 : CO waveshape switch CV in
26 : preamp "to prog"	26 : LPG1 mode switch CV in
27 : LPG2 mode switch CV in	27 : offset (+13.5V)
28 : inverter "from prog"	28 : signal routing switch CV in