BRAINS

BRAINS

CLK

RST

RUN

DIR

T-GATE

T-CLK

MAKENOISE

MAKENOISE

v2.5

BRAINS

Make Noise warrants this product to be free of defects in materials or construction for a period of one year from the date of purchase (proof of purchase/invoice required).

Malfunction resulting from wrong power supply voltages, backwards or reversed eurorack bus board cable connection, abuse of the product, removing knobs, changing face plates, or any other causes determined by Make Noise to be the fault of the user are not covered by this warranty, and normal service rates will apply.

During the warranty period, any defective products will be repaired or replaced, at the option of Make Noise, on a return-to-Make Noise basis with the customer paying the transit cost to Make Noise.

Make Noise implies and accepts no responsibility for harm to person or apparatus caused through operation of this product.

Please contact technical@makenoisemusic.com with any questions, Return To Manufacturer Authorization, or any needs & comments.

http://www.makenoisemusic.com

About this Manual:
Written by Tony Rolando
Edited by Walker Farrell
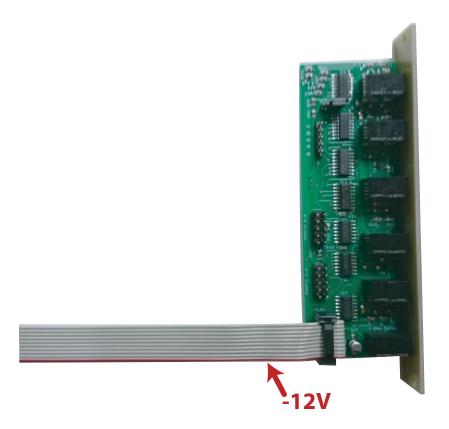Illustrated by W.Lee Coleman

Electrocution hazard!

Always turn the Eurorack case off and unplug the power cord before plugging or un-plugging any Eurorack bus board connection cable cable.
Do not touch any electrical terminals when attaching any Eurorack bus board cable.

The Make Noise BRAINS is an electronic music module requiring 10mA of +12VDC and 0 mA of -12VDC regulated voltage and a properly formatted distribution receptacle to operate. It must be properly installed into a Eurorack format modular synthesizer system case.

Go to http://www.makenoisemusic.com for examples of Eurorack Systems and Cases.
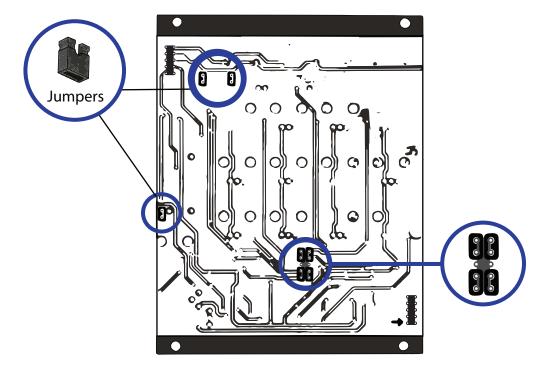
To install, find 4HP in your Eurorack synthesizer case, confirm proper installation of included eurorack bus board connector cable on backside of module (see picture below), plug the bus board connector cable into the Eurorack style bus board, minding the polarity so that the RED stripe on the cable is oriented to the NEGATIVE 12 Volt line on both the module and the bus board. On the Make Noise 6U or 3U Busboard, the negative 12 Volt line is indicated by the white stripe.
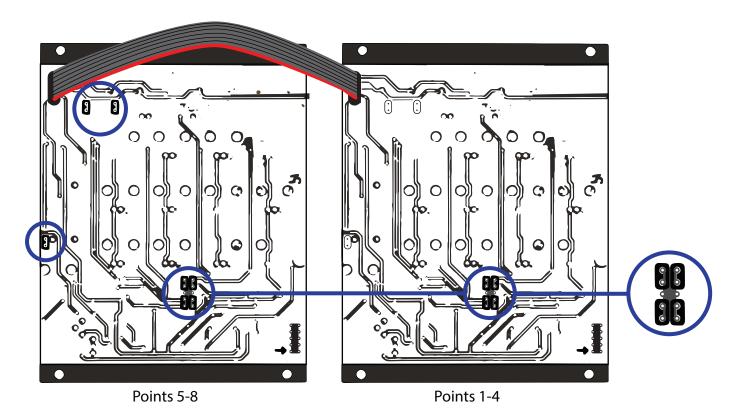

-12V

Please refer to your case manufacturers' specifications for location of the negative supply.
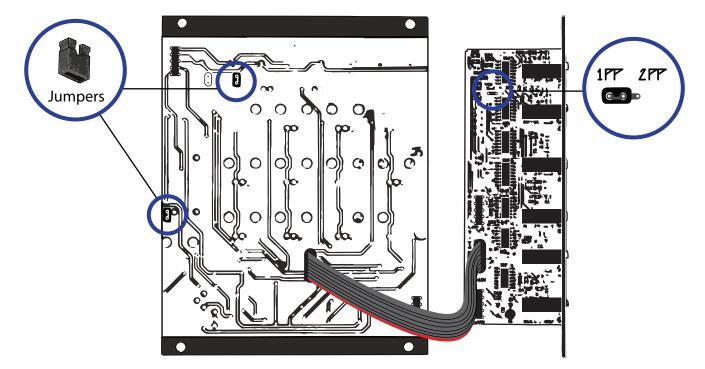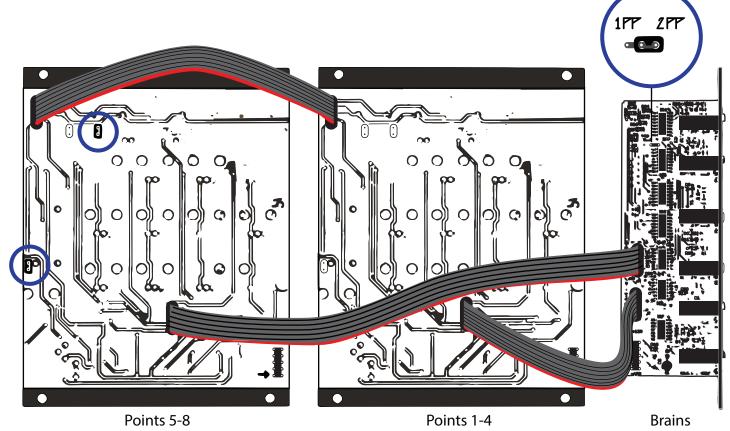
(Power connections for each module not shown for clarity.)

Jumpers

Single PRESSURE POINTS with no BRAINS attached: Note all the "Close 4 Master" locations are closed, as well as the Expand headers.

Points 5-8   Points 1-4

Two PRESSURE POINTS, chained: Note that the "Close 4 Master" headers are closed on the first unit (will be on the right when installed in the case). For three or four PRESSURE POINTS, use 4-header CHAIN cable and leave "Close 4 Master" headers open on all units but the master (rightmost when installed/leftmost from behind). Also, note the jumpers on the EXPAND headers.
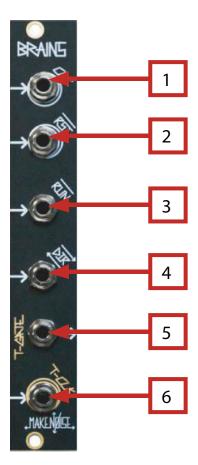
BRAINS with a single PRESSURE POINTS: Use the single open "Close 4 Master" header, the BRAINS cable connected from "Points 1-4" header to EXPAND header, and the jumper on BRAINS set to "1PP."

Points 5-8   Points 1-4   Brains

BRAINS with two PRESSURE POINTS:
Two is the maximum number of PRESSURE POINTS that can be attached to a single BRAINS. Note: the connections of "Points 1-4" and "Points 5-8" to EXPAND headers the single open location on the "Master" PRESSURE POINTS' "Close 4 Master" headers; all three "Close 4 Master" locations open on the non-master PRESSURE POINTS, and the Jumper on BRAINS set to "2PP."

1. Clock Input: A rising edge of clock, pulse or trigger (of at least 1V) advances to next stage of PRESSURE POINTS. Patch here to sequence.

2. Reset Input: jumps to last touched stage on rising edge of clock, gate, pulse or trigger, of at least 1V.

3. Run Input: Gate or Voltage of at least 1V tells BRAINS to RUN, and thus a Gate or voltage below 1V stops BRAINS.

4. Direction Input: Gate or voltage of at least 1V tells BRAINS to count Forward; Gate or voltage below 1V tells BRAINS to Run Backward.

5. Touch-Gate Output: Generates 10V Gate when connected PRESSURE POINTS is touched. This replaces the PRESSURE POINTS combined Gate Output.

6. Touch-Clock: Secondary clock input. When patched, PRESSURE POINTS will only respond to touch when Gate is high at T-CLK.

BRAINS is a clocked sequential binary event machine, intended to be connected to tactile controllers such as the PRESSURE POINTS.

Once connected, PRESSURE POINTS provides data input to BRAINS in the form of touch-selectable Reset stage and Hold stage. PRESSURE POINTS also provides the tuned voltages and Pulses per stage. BRAINS, when connected to either 1 or 2 PRESSURE POINTS, drives the stage selection in a sequential fashion, at a rate determined by the incoming clock at Clock Input, thus forming a 4-Step or 8-Step 3-channel analog sequencer. Binary control over Direction of the stage selection, RUN/Stop and Reset are provided.

Touch-Clock Input
T-CLK is normaled high and controls whether PRESSURE POINTS stages can be selected by touch. If T-CLK is low, stages can only be selected via the BRAINS inputs, and all touch selection will be ignored (Pressure and T-GATE outputs are still active). Multing a narrow clock to the T-CLK input and has the effect of "quantizing" manual stage selection to the clocked sequence. Using a dummy cable in T-CLK allows Pressure and T-GATE outputs to be totally independent of the BRAINS sequence.

Touch-Gate Output
The only output on BRAINS, producing a Gate High signal whenever the connected PRESSURE POINTS is touched.

Single Shot:
Patch any one of the 3 tuned voltage outputs to RUN Input. Set all pots in the corresponding row to full CW. Sequence should play through all stages. Now set the pot at the stage where you want the sequence to stop, Full CCW. BRAINS counts to this stage and stops. Touching any stage other than the stage where the sequence is stopped, runs the sequence until the stop stage is reached.

Knight Rider
KIT Style sequencing: with sequence running, patch the Gate Output from Stage 8 to the Trigger Input of MATHS CH. 4. Take EOC Output from MATHS, patch to BRAINS Direction Input. Set MATHS CH. 4 Rise to 12:00, FALL to Full CW and Response to Linear. Patch Gate Output from Stage 1 to MATHS CH. 4 BOTH Control Input. Sequence should travel back and forth like KIT car from Knight Rider.

Touch Controlled Pattern Length:
With sequence running, patch the Gate Output from Stage 8, to BRAINS Reset Input. Touch the plate of the stage that is to be the start of the sequence. The sequence now runs to stage 8 and returns to last touched stage, effectively giving you touch control of sequence length.

Touch Controlled JUMP:
With a sequence running, patch the Gate Output from any of the middle Stages of PRESSURE POINTS (3, 4, 5, 6), to BRAINS Reset Input. Touch the plate of the stage AFTER the one with Gate applied to Reset Input. Watch sequencer jump over stage. Combine multiple stages to Reset for longer jumps or multi-jumps.

Gate Output:
With BRAINS attached, exactly one Gate Output is high at any given time: the Gate Output for the currently selected Stage. This makes BRAINS more useful as a patch-programmable sequencer, but also because of this, PRESSURE POINTS Common Gate Output is no longer found on the rightmost stage Gate Output (it would be high at all times). Common Touch Gate output is now found on T-Gate output of BRAINS. To achieve a Gate for each pulse of the clock, Mult the Clock instead of using PRESSURE POINTS Gate Outputs.

Voltage Controlled Direction:
Make individual stage selection impossible by patching a dummy cable to the T-CLK input. This can be useful if you would like to use the Pressure and/or T-Gate Outputs without interrupting a sequence. For touch-controlled direction change, try also patching T-Gate to the Direction input with this dummy cable still in place.
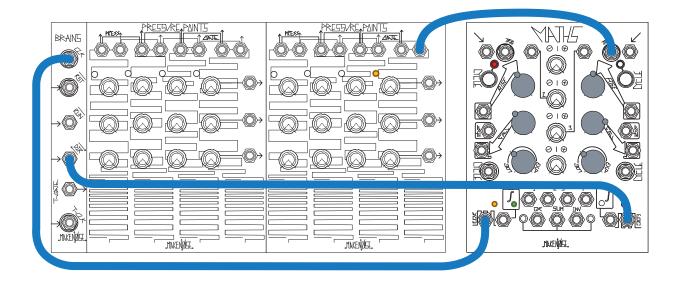
Combined Output:
To achieve the Combined Output from PRESSURE POINTS, patch the BRAINS T-Gate Output (for touch-activiated Gates from every stage) or Mult the clock signal (for sequencer Gate from every stage).

OR Logic:
Gates are set up as a OR Logic and thus, may be combined with a passive multiple or stackable cables.
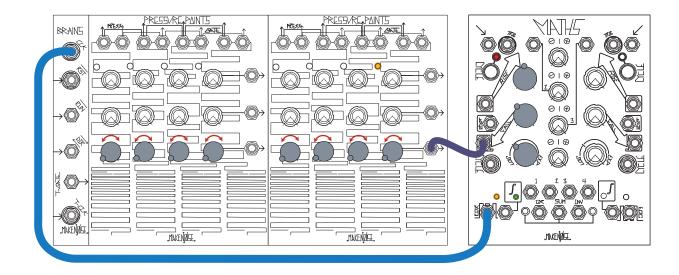
Voltage Controlled Pendulum:
With sequence running, patch the Gate Output from Stage 8 (or 4, or ?) to the Trigger Input of MATHS CH. 4. Take EOC Output from MATHS, patch to BRAINS Direction Input. Set MATHS CH. 4 Rise to 12:00, Fall to 3:00 and Response to Linear. The sequence should be traveling BWD at this point, but it really depends upon the rate of the incoming clock at BRAIN CLK Input. By setting or modulating the Fall parameter of CH. 4, you will have control over the direction of the sequence and how long sequence travels in that direction.

Buchla 250e Style Movement:
Patch MATHS CH. 1 EOR to Clock Input, BRAINS. Set MATHS to Cycle, Rise panel control to Noon, Fall will set upper limit of clock rate. Sequence should be running. Patch the bottom most row of Tuned Voltages from PRESSURE POINTS, to MATHS CH. 1 Fall Control Input. Set all potentiometers in corresponding row to Full CCW. Sequence is now running at the upper limit (fastest) tempo/rate. This Row of pots is like the INNER row of pots on the 250e, each setting their corresponding stage's length. As you set any stage's pot further CW, the length of that stage increases. The other two rows of pots in the PP/BRAINS system are used like the OUTER row of pots on the 250e, and at their outputs, you have the Arbitrary Function quantized to the Master Clock.

UEG, MARF, ARF like:
Begin with the Buchla 250e Style Movement patch. Now patch the output of the middle row of Tuned Voltages to MATHS CH. 4 Signal Input. Set Rise and Fall panel controls to 12:00. Set Response to Linear. Signal Output on MATHS CH. 4 is your CV output, patch it to VCO, VCA, VCF, you know the game! Mult the bottom-most row of Tuned Voltages from PRESSURE POINTS (the same row controlling stage length), to MATHS CH. 3 Input. Set CH. 3 Scale/Inversion to Full CCW. Apply output of CH. 3 to MATHS CH. 4 BOTH Control Input. Sequence runs at a rate determined by the bottom row. The control signal generated by the sequence is interpolated according to the length of the stage, as set by the bottom most row of PP/BRAINS. Additionally, try combining this patch with Single Shot patch to achieve a touch-triggered, multi-stage envelope.