The **Passive Multiple** is a simple but important module that allows for sending a signal to multiple destinations. Within the Make Noise system the Multiple may also be used for combining clock, gate and pulse signals together to create interesting timing sources (in other words, it acts as a Gate combiner aka logic OR circuit). It has 9 inter-connected sockets that may be split into different group combinations depending upon how it is patched. The jacks circled in white will make or break the interconnects between the 3 groups of three, thus allowing for three 3-way, one 5-way / one 3-way or one 7-way multiple. The Multiple is passive. The Make Noise system does not require Buffered Multiples since all critical control signals are already buffered.

The **CV Bus** provides visual indication of level, rate and polarity for up to 4 color-coded control signals that will be shared throughout a patch. They are distributed across the center of the system allowing for quick, clean and intuitive patching. The visual indication makes navigating complex patches easier and intuitive. The CV Bus also has the tools needed for integrating the Make Noise system with the outside world. A 1/4" Mono input with plenty of gain allows for bringing external signals into the system. The optimal 10Vpp signal level is visually indicated. A high quality Stereo Line Driver converts powerful modular synthesizer signal levels to the commonly used Line Level. There is mini-jack inputs for Left and Right, a single Master Volume control, and a TRS Stereo 1/4" output jack. This output is capable of driving long cable out to a PA System or a set of Headphones. It has AC coupling and a built-in limiting circuit (with visual indication).

PASSIVE MULTIPLE

INPUTS & OUTPUTS: Each jack can operate as an input or an output, except the white-circled jacks, which are "input only." Patching into one input creates a split of that input into all other jacks, which can then operate as outputs, where the input signal can be tapped. A few other notes:

- You can input a signal into any one of the 9 jacks. The output is tapped from any of the other jacks.
- You can split any kind of signal: audio, CV, or gates.
- You can also mix (combine) clock, gate and pulse signals (OR logic). You cannot mix audio or other CV signals. Combination of Audio / other CV signals is not supported, but will not damage anything.
- The only time a buffered multiple is needed is when control voltage is sent from an unbuffered output to multiple destinations that require unity at the input; typically, 1v/oct inputs. Because all critical CV outputs in the Make Noise System are buffered, a passive multiple is all that is needed.
- White-circled jacks make or break connections within the Multiple. While all other jacks are normalled, meaning, they split the signal to all other outputs, the white-circled jacks are "input only," and are not used as outputs. In this way, you can create various multiple combinations: three 3-way, one 5-way & one 3-way, or one 7-way multiple. From a practical standpoint, here's what that means:
  - 3x (1 input / 2 outputs)
  - 1x (1 input / 4 outputs) and 1x (1 input / 2 outputs)
  - 1x (1 input / 6 outputs)

CV BUS (available as part of the *Shared System with CV Bus* and *Black & Gold Shared System*)

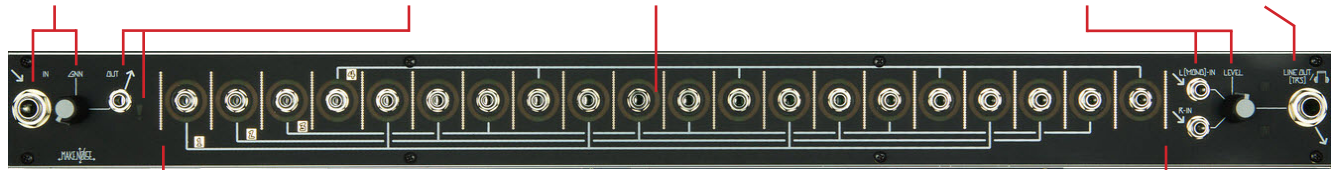| **INPUT & GAIN ROTARY:**	**OUTPUT & LED CLIP INDICATOR:**	**IN/OUT LEVEL, RATE, POLARITY & COLOR CODING:**	**L (MONO) & R INPUT & LEVEL ROTARY:**	**LINE OUT (TRS):**
1/4 inch audio input jack for outside sources to be brought into the modular system. Since line levels are lower than modular levels, there is a unipolar **Gain Rotary** to increase the amplitude of the audio input signal.	After the audio signal / gain path, you can use this 1/8 inch jack to output the audio to any destination in your modular system. The **LED Clip Indicator** will show as a red exclammation mark if the level is too hot / volume too high. If this happens, ease back on the Gain Rotary.	Surrounding each Input & output jack is an LED. This indicates the following: **Level** is indicated by the brightness of the LED. Brighter = higher level, duller = lower level. **Rate** is indicated by the pulse of the LED. **Polarity** is indicated by position of the LED. Positive = upper circle half lit, negative = lower circle half lit. **Color** indicates the different busses on the system. Green is bus 1, red is bus 2, yellow is bus 3, and orange is bus 4. The colors are a great visual indicator, so that you can see which signals are being output on each bus.	This is the mono / stereo audio output from the modular system. The associated unipolar **Level Rotary** allows you to adjust the output volume.	1/4 inch Stereo TRS audio jack that can be used to send the final modular output to headphones, PA system, or DAW for recording.

INPUTS & OUTPUTS: As with the standard Multiple, each jack can operate as an input or an output. However, there are no "input only" jacks, and jacks are not "normalled" along the entire bus. Instead, there are four distinct busses. This means that you can patch an input anywhere on the system to produce four corresponding output splits. The lines on the faceplate denote the four busses.

- You can input a signal into any one of the 20 jacks. The outputs are then tapped from the four jacks associated to the input (noted by the lines on the faceplate). In order to create additional splits of a single input, patch from one of the split outputs into a second bus line. For example, if you input a signal on the first jack (at the left), Bus 1 outputs 4 signals via the Bus one output jacks. Take on of those outputs and patch into the second jack (from the left) to create an additional set of 4 output splits. Bus 1 now has 3 outputs (the fourth being sent into Bust 2 input), and Bus 2 has 4 outputs (for a total of 7 splits of the one input signal). The CV Bus is a 4 input / 16 output multiple.
- You can split any kind of signal: audio, CV, or gates.
- You can also mix (combine) clock, gate and pulse signals (OR logic). You cannot mix audio or other CV signals. Combination of Audio / other CV signals is not supported, but will not damage anything.
- The only time a buffered multiple is needed is when control voltage is sent from an unbuffered output to multiple destinations that require unity at the input; typically, 1v/oct inputs. Because all critical CV outputs in the Make Noise System are buffered, a passive multiple is all that is needed.
- Here are some of the combinations that can be created with the CV Bus:
  - 4x (1 input / 4 outputs)
  - 2x (1 input / 7 outputs) -- *note: 1 split output is sent into a second bus input.*
  - 1x (1 input / 10 outputs) -- *note: 2 split outputs are sent into second and third bus inputs.* and 1x (1 input / 4 outputs)
  - 1x (1 input / 13 outputs) -- *note: 3 split outputs are sent into second, third, and fourth bus inputs.*

For an informative video about the CV Bus, see here: Make Noise System Tutorial 3: Control Voltage (CV) and Polarity.