

BUFFMULT
4ms Company

Eurorack Module User Manual v1.0 (2013-12-06)

The BUFF MULT from 4ms is a wide-bandwidth, two channel 1-to-3 buffered multiple with red/white LEDs indicating positive/negative voltage.

The BUFF MULT can also be connected as a 1-to-6 multiple.

Features

- Two input jacks (white). Bottom input is normalized to top input jack
- Six output jacks (black), fully buffered
- Two LEDs (red/white) indicate signal
    - Red = positive
    - White = negative
- Wide-bandwidth
    - Full audio range, no roll-off in the upper frequencies
    - DC-coupled allows CV and other low-frequencies to pass unaltered
    - Suited for LZX Visionary and other systems requiring high frequencies
    - 100MHz bandwidth
    - 510 ohm output impedance (very low)
    - >10 mega-ohm input impedance (very high)

Specifications

- 3HP
- 18mm deep (0.75”)
- 10-pin power cable included

Power usage

- 13mA on +12V
- 13mA on -12V
- +5V not used

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http://4mspedals.com/buffmult.php

Uses

Every system needs at least one BUFF MULT. They can can help in a variety of ways:

- **Checking a signal.** Just plug into a white jack and watch the LED.
- **Routing a signal to multiple places.** Normally there is a small voltage drop when splitting a signal (“stacking” or passively mult'ing). This is especially noticeable with a 1V/oct signal (a sequencer line, a keyboard CV signal, or any “pitch” signal), because a small voltage drop will sound drastically out of tune. The BUFF MULT prevents any voltage drop.
- **Live patching.** If you perform live often, you probably have the habit of turning something down before patching or unpatching. Often in modular systems a signal gets split into 3, 4, 5 or more signals, making it a hassle to mute everything if you just want to plug/unplug one thing. Using a BUFF MULT prevents this: if you plug/unplug a cable, no thump/glitch/zap/buzz will appear on the other lines.
- **Sharing a clock.** For rhythmic patches, it's often critical to have a master clock. Whether you're sharing a clock with several modules within your system or sharing it with other systems, it's important that the master clock keeps running. Best practice is to run the master clock directly into the BUFF MULT. Run the six BUFF MULT outputs to your destinations. Even if you accidentally short out a cable to the faceplate or jack nut, the master clock will not glitch. Plus, you can watch the blinking LED!
- **Protecting your equipment.** Putting a buffer in between modules will protect the inputs and outputs from damaging each other. If you are concerned about a module being damaged (e.g. a DIY module, external gear, or gear that is suspected of being faulty), use a BUFF MULT!
- **Connecting to external gear** (or another modular system). Put the BUFF MULT towards the edge of your case. When you need to run a signal in or out of your case, use a short cable to go to the BUFF MULT, and then use a long cable to go to the external gear. This keeps things clean in two ways: less noise on the line, and less cable clutter. It also protects your expensive modules if something were to yank the cable (kittens, children, improv musicians).
- **Conditioning a signal**. A common problem is that a trigger signal from external gear will not trigger a eurorack module. Even if the outboard gear's voltage is rated high enough (e.g. 5V), the “drive”, or output impedance, may be too weak to cause certain modules to detect a trigger. The BUFF MULT fixes this. It has a very high input impedance, meaning *anything* can drive it. It also has a very low output impedance, meaning it will drive *anything. Note: if you need to boost the voltage of a signal, use a 4ms SISM.*

Patching

- Dual 1-to-3 buffered multiple
  - Plug the first signal into top white jack and take the buffered outputs from the top three black jacks
  - Plug the second signal into bottom white jack and take the outputs from the black jacks below.
  - The top LED will display the top channel's signal, and the bottom LED will display the bottom channel's signal (see LED colors).
- Single 1-to-6 buffered multiple
  - Plug into the top white jack, and take the outputs from all six black jacks.
  - Do not plug into the bottom white jack.
  - Both LEDs will display the signal.
- Signal checker
  - Run a signal into either white jack, and run the black jack below it to the destination module
  - Watch the LED to check your signal.

LED colors

The LEDs are useful for seeing what's happening with your signal.

- Red indicates a positive voltage is present.
- White indicates a negative voltage is present.
- Red and White at the same time indicates a bi-polar AC signal (positive and negative)
- Flashing Red indicates a clock, trigger, gate, or LFO (positive-only).
- The brightness of the LED indicates how strong the signal is (amplitude)