

INTRODUCTION

Test 3 is a purpose-designed tool for measuring voltages and currents in your Eurorack system. This means that just a single circuit board or module can now replace a convoluted test setup with multiple multimeters, custom cables etc.

Two push buttons allow you to cycle the value shown on the LED display between three measurements (voltage, current and stored peak current) of the three power rails. The peak currents continually update in the background on all rails, making it ideal for quickly getting maximum current figures.

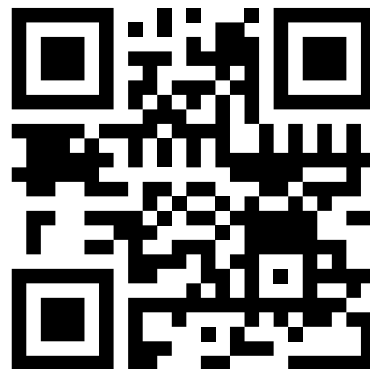
Apart from measuring the current draw of a single module, Test 3 also supports testing power supplies and cables, measuring an entire system (up to 1 A of current on each rail), troubleshooting DIY modules, powering a skiff or breadboard from a larger system...

BUILD INSTRUCTIONS

Test 3 is available as a Do-It-Yourself ('DIY') Kit with an optional Front Panel Kit.

For detailed build instructions, scan the QR code below with your mobile device or visit this URL: <https://joranalogue.com/test3/build>

The Build Instructions document also lists the package contents for both the DIY Kit and Front Panel Kit.



CONTROLS & CONNECTIONS

1 LED DISPLAY

The selected measurement of the selected power rail is shown on the LED display.

If the measurement goes above the limit, the display will blink to indicate an overload condition.

2 RAIL LEDS

The LED of the currently selected power rail (+5, +12 or -12) lights up.

3 RAIL BUTTON

Press the rail button to cycle through the power rails.

4 MODE LEDS

The LED of the currently selected measurement (voltage in volts or current in milli-amps) lights up. The mA peak LED flashes briefly if a new peak current value is reached on one of the rails, and stays lit continually when in peak mode.

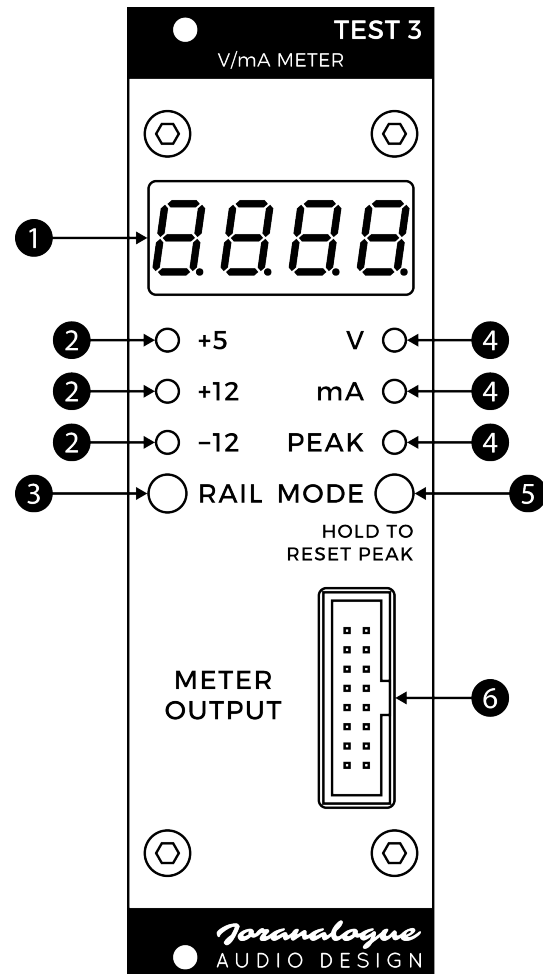
5 MODE BUTTON

Press the mode button to cycle through the measurement modes.

If this button is held down, the mode will switch to mA peak and the display will blink. Release the button to reset all stored mA peak values to 0, or press the rail button to cancel.

6 METER OUTPUT HEADER

Connect a module to this output socket via a standard Eurorack power cable to measure its current draw. Using a 'flying busboard' power distribution cable, multiple modules can be connected as well (up to 1 A of current per rail). The power rails are protected against reverse voltage, but not against large continuous overloads!



HOW TO USE

VOLTAGE (V)

Eurorack modules are powered from three DC voltage rails: +5 V, +12 V, and -12 V. Not all modules use all three rails. The +5 rail is considered optional: it is meant to power digital circuitry, and not all power supplies deliver it.

Test 3 allows you to check the voltage rails of a power supply. Simply set it to V mode, and cycle through the rails using the rail button. The measured voltages should be within about 10 % of their nominal values.

If a power supply is overloaded, the voltages on one or more rails will start to drop, until eventually the overcurrent protection engages and one or more rails are switched off. If only one rail goes out, this can damage some modules. Test 3 allows you to monitor the rails, so you can switch off an overloaded system before damage occurs.

CURRENT (mA)

The current draw of Eurorack modules can vary greatly. Analogue modules tend to draw constant currents, changing slightly with knob settings. Digital modules often have irregular current draws, changing greatly depending on the selected operation mode. LEDs and displays also have a large impact on the current draw.

It's important to determine the maximum current draws of a module on the different rails. The Eurorack system's power supply should have enough capacity to source these currents, at all times. These are the figures that should be published, not the 'typical' values! Once the maximum current draws of all modules in a system are known, calculating the current draws of the entire system is simply a matter of adding up the figures of the separate rails.

In the regular mA mode, Test 3 will show the real-time current draw. Whenever a maximum value is reached, it is stored to the mA peak. To measure a module's maximum current draws, power it from the Test 3 meter output header and use it in various ways: try different knob settings, patch inputs and outputs, and make as many LEDs light up as possible. Once you're done, use the mode button to enter the mA peak mode, and write down the values of the different rails.

Modules will often draw a large current spike when powered up. A power supply should be able to handle these short spikes, which can also vary greatly, so you typically don't need to measure these. It's recommended to reset the mA peak measurements (by holding down the mode button) after plugging in a module. This removes the start-up measurements, allowing you to get the maximum current draws during actual use.

If you are building your own DIY modules, Test 3 can be a very useful troubleshooting tool. After building a module, first check if there aren't any short-circuits on the power lines using a standard multimeter. Then power it from Test 3 and monitor the current draw(s). If these figures are wildly different from the expected values, this indicates that there's an issue with the module.

Test 3 is also an excellent aid during Eurorack module development. Use it to power breadboards and prototypes, and track how the module's current draws change as the design progresses. As design problems often cause excessive current draws, this can speed up the development cycle.

SPECIFICATIONS

FORMAT

Doepfer A-100 'Eurorack' compatible module
3 U, 8 HP, 28 mm deep (inc. power cable)
Also available as semi-assembled circuit board,
without front panel.

MEASUREMENTS

V: 20 mV resolution, 20 V maximum,
±5 % accuracy, updates at 10 Hz
mA: 1 mA resolution, 1 A maximum,
±5 % accuracy, updates at 10 Hz
mA peak: updates at 100 Hz on all rails
simultaneously

BURDEN VOLTAGE

50 μ V/mA

MAXIMUM CURRENT DRAW

+12 V: 35 mA

Test 3 draws all current needed for its operation
from the +12 rail. This current is not added to the
mA measurement of the +12 rail. Negligible
current (< 1 mA) is drawn from the +5 and -12
rails if these are available. At least 7 V is required
on the +12 rail for Test 3 to power up and
function properly.

POWER PROTECTION

Reverse polarity (MOSFET)

OUTER DIMENSIONS (H X W X D)

104 x 39 x 11.5 mm (circuit board)

128.5 x 40.3 x 24 mm (module)

MASS

Without front panel: 30 g

With front panel (module): 60 g

DIY Kit: 50 g

Front Panel Kit: 45 g

SUPPORT

As all Joranalogue Audio Design products, Test 3
is designed, manufactured and tested with the
highest standards, to provide the performance
and reliability music professionals expect.

In case your Test 3 isn't functioning as it should,
make sure to check if you have followed the
Build Instructions exactly. Also check your
Eurorack power supply and all connections.

If the problem persists, contact your dealer or
send an email to support@joranalogue.com.
Please mention your serial number, which can be
found on the circuit board's rear side.

REVISION HISTORY

Revision B: initial release.

With compliments to the following fine people,
who helped to make Test 3 a reality!

Björn Jauss Boris Uytterhaegen

Eric Lukac-Kuruc François Gaspard

Čirts Ozoliņš Gregory Delabelle

Jan D'Hooghe Jens Van Daele

Everyone at Wired Electronics

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AUDIO DESIGN

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Designed & made in Belgium