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## NL412 - Pulse

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### **Introduction**

The **NL412 PULSE** is a small, handheld, general purpose pulse generator which can be used to "**start**" experiments, command the "**gate**" of a train of pulses or be used with an NL102G to "**Buzz**" electrodes.

The NL412 is self-powered by a standard internal 9 V battery and is fitted with a 2 m lead terminating in the standard Lemo connector.

### **Start**

On pressing the button the NL412 generates an active high pulse which will trigger remote modules.

### **Gating**

The front panel control on the NL412 provides control for output pulse durations over the range of 1 to 10 ms. Setting this control allows different durations of trains of pulses when the NL412 is combined with a Pulse Generator such as the NL301.

### **Use with NL102G**

When used with a NL102G (that incorporates external "Buzz" control circuitry) the duration of the "Buzz" is set by the front panel control. See below.

### **Technical Note - NL102G use.**

During intracellular micro-electrode recording, cell penetration is often facilitated by use of a Buzz button, a feature included on the front panel of the NL102G DC pre-amplifier. Pressing the Buzz button fully activates the capacitance compensation circuitry, causing the amplifier voltage to oscillate. This oscillation often aids passage of the electrode into the intracellular milieu.

In certain situations, it may be necessary to operate the Buzz button in combination with microelectrode manipulation, making the front panel location of the Buzz button less convenient for the user. To make the Buzz feature more accessible, a remote **NL412 Pulse** box has been developed by Digitimer Ltd. This small handheld unit provides control over Buzz duration (1-10ms) and has a single push button for Buzz pulse delivery.

The NL412 is connected via its own 2m long Lemo cable to a modified version of the NL102G, incorporating an external Buzz control input socket. Existing users of NL102G modules can have the modification made at Digitimer Ltd.

Specifications over ...

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**Specification Summary**

Button	Only produces an output pulse on "Press" (not release)
LED	Amber - illuminates for approximately 250 ms after each press
<b>Pulse Duration</b>	
Range	1 to 10 ms
Accuracy	better than 20% at all scale markings
<b>Output</b>	
Level	9 V, with new battery.
Rise and Fall times	<100µs
Battery	Standard 9 V, 6LR61 style. (Non-alkaline supplied) - We recommend the Duracell Ultra MN1604 alkaline battery.
Power consumption	<5 µA (static)
Cable	2 m (nom) with standard Lemo connector fitted.
Size	61 x 105 x 28 mm (w x h x d) plus 15 mm on "d" for knob.
Weight	<170 g including battery.

We reserve the right to alter specifications and price without prior notification.

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