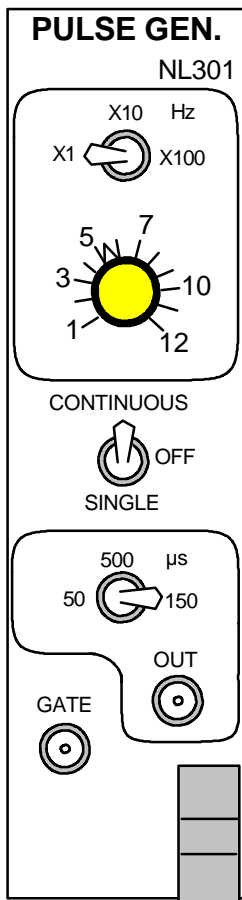

 NL301 - Pulse Generator



Introduction

The **NL301 PULSE GENERATOR** is a low cost module for producing trains of uniform TTL pulses. It can be operated continuously, switched off, or a single pulse can be triggered manually. It is the successor to the NL300.

A GATE input socket is provided to allow synchronous trains of pulses to be gated-on by an externally applied TTL high logic level. An internal jumper either excludes (as with the NL300) or produces an output pulse coincident with the start of the GATE signal.

Pulse frequency is continuously variable over more than three decades using a single 12:1 control and a three position decade switch. Three fixed output pulse widths are available.

The frequency range and pulse widths were chosen to make this module suitable as a timing source for electrical stimulation of the nervous system, without the necessity of additional modules for determining the pulse width.

The **NL301** is also useful for a variety of other timing purposes where a widely variable rate is desirable, and precision is important but not critical.

Frequency Range

The front panel control is marked in integer marks between 1 and 12 and is calibrated to be within 1% accuracy at the '1' and '10' marks. At the other marks it will be within 5% accurate.

Even though the scale is not marked below '1' the **NL301** will produce an output frequency down to '0.5'. This gives a 0.5-12 (or 24:1) range on a single control. With the three decade toggle switch the total range of 0.5 Hz to 1200 Hz can be covered in three over-lapping ranges.

An internal jumper is fitted to change the 0.5-1200 range to 0.05-120 Hz by changing the board jumper. When this jumper (LK2) is fitted the range will be 0.05-120 and when removed it will be the marked 0.5-1200 Hz. -see diagram that follows.

Single/Off/Continuous

This three way toggle switch allows a single output pulse at the set pulse width when it is pressed into the 'SINGLE' position. The switch is biased so that it will not stay in this position. In the 'OFF' position there is no output. In 'CONTINUOUS' the output can be gated - see diagram that follows.

Gate Function

The Front Panel socket allows the **NL301** output train to be gated on and off.

In CONTINUOUS mode the output pulse train will start in synchronism with the positive going edge of the GATE signal and continue until the GATE signal is taken low or the toggle switch is switched out of 'CONTINUOUS'.

When there is no connection to the 'GATE' socket, the NL301 will give a continuous train of pulses when switched to 'CONTINUOUS'.

First Pulse Option

An internal jumper exists that can enable an output pulse coincident with the positive edge of the GATE signal. The alternative is for the first output pulse to be one period of the selected frequency after the start of the GATE signal (as was the case with the NL300). -see Fig. 301-1.

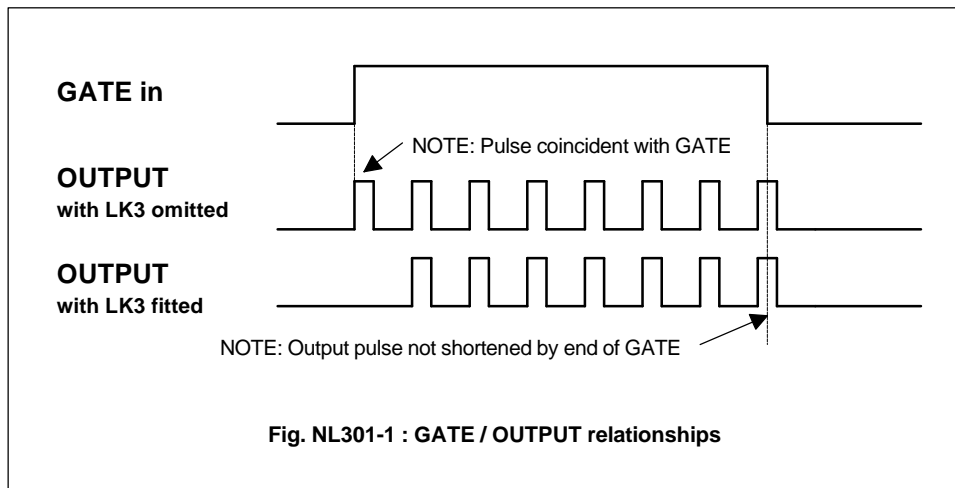
The on-board jumper (LK3) is fitted to join the two pins or not.

| | |
|-----------------|---|
| Pins joined | No pulse coincident with the start of GATE |
| Pins not joined | First pulse will be coincident with the start of GATE |

Specifications

| | |
|-----------------------|---|
| Frequency | |
| Total range | <1 to 1200 Hz |
| Control | Single turn (270°) control marked 1 - 12 Hz with intermediary integer panel marks. Maximum range > 0.5 - 12 |
| Accuracy | ±1% at '1' and '12' marks ±5% at other scale marks |
| Multiplier | x1 ; x10 ; x100 |
| Internal Jumper (LK2) | x0.1 multiplier giving:- <0.1 to 120Hz on the front panel controls |
| Gate | |
| Control | TTL 'high' (or socket open circuit) enable oscillator TTL 'low' inhibits oscillator |
| Internal Jumper (LK3) | Pins Joined - No pulse coincident with GATE start Pins Open - First pulse coincident with GATE start |
| Input | TTL compatible, 1 TTL load maximum +15V |
| Output pulse widths | 50, 150 or 500 µs (±5%) |
| Output fan-out | 10 TTL inputs |

Fig. NL301-1 : GATE / OUTPUT relationships



Jumpers

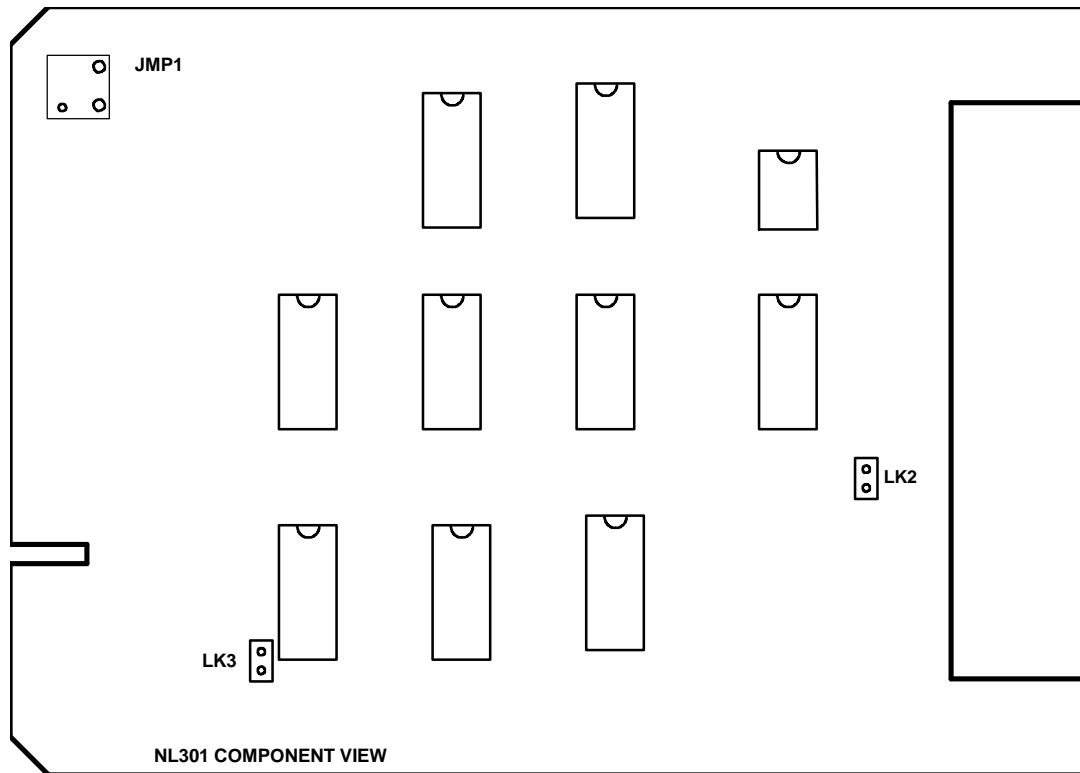


Fig. NL301-2 : On-board jumpers

LK2 - Range Select Jumper these pins together to reduce the front panel range by a factor of 10.

LK3 - First Gate Pulse Jumper these pins together to enable a pulse coincident with the start of the Gate.

JMP1 - Rear Input Jumper the two gold sockets to source the GATE signal from the output of the module on the immediate left.

Last Revision: March 4, 1998

File Reference: N:\DOCS\COMPANY\MANUALS\NEUROLOG \NL301.SAM
