



*LA Techniques Ltd*

**LA19-01-03 PULSE  
PATTERN GENERATOR**



The LA19-01-03 is a pseudo random pulse pattern generator capable of operation up to 3 Gb/s. It provides a fast rise time and low pulse distortion. The unit can accommodate two internal clock generators and supports an external clock input. It provides a clean pulse output suitable for applications such as optical communications, fast pulse amplifiers and high speed logic circuits development. Remote control is via an IEEE488 interface.

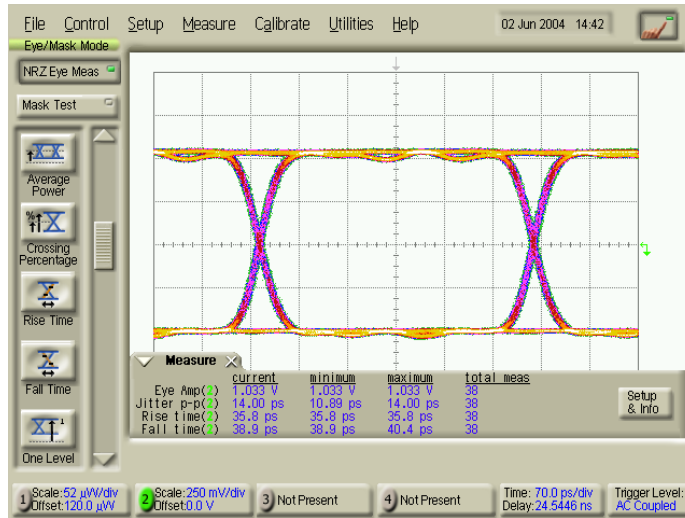
- Operation to 3 Gb/s
- 45 ps rise and fall times
- Low skew differential outputs
- 2  $v_{pp}$  output amplitude (differential)
- GPIB Interface
- Low cost

## Electrical Specification

( $t_{amb} = 25^{\circ}\text{C}$ )

Parameter	Units	Min	Typ	Max
Operating frequency				
Internal clock 1 (factory set) <sup>1</sup>	GHz	0.15	-	3.0
Internal clock 2 (factory set) <sup>1</sup>	GHz	0.15	-	3.0
External clock	GHz	0.15	-	3.0
External clock				
Input level (0.4 – 2.9 GHz)	V <sub>pp</sub>	0.5	-	2.5
Input level (<0.4, >2.9 GHz)	V <sub>pp</sub>	1.4	-	2.5
Internal clock				
Stability	ppm/ <sup>o</sup> C	-	0.3	1
SSB phase noise (100 kHz offset)	dBc/Hz	-	-95	-
Pseudo random binary sequence				
Pattern length <sup>2</sup> (2 <sup>n</sup> -1)	n	-	7,23	-
Mark ratio	-	-	1/1	-
Data output (Data and Data bar) <sup>3,4,5</sup>				
Single ended amplitude	V <sub>pp</sub>	0.9	1.0	1.1
Rise / fall time (20% to 80%)	ps	-	45	60
Skew	ps	-	-	10
Jitter(using internal clock) <sup>7</sup>	ps	-	20	30
Overshoot	%	-	5	10
dc Bias injection (BNC connector)				
dc current	mA	-100	-	100
dc voltage	v	-15	-	+15
dc resistance	Ω	15	18	25
3 dB bandwidth <sup>5</sup>	kHz	5	10	-
Clock output <sup>3</sup>				
Amplitude	V <sub>pp</sub>	0.6	1.0	1.5
Rise/fall time (20% to 80%)	ps	-	120	200
Clock/16 output <sup>4</sup>				
Amplitude	V <sub>pp</sub>	0.8	1.0	1.5
Rise/fall time (20% to 80%)	ps	-	120	200
Pattern sync output <sup>3,6</sup>				
Amplitude	V <sub>pp</sub>	0.8	1.2	1.5
Rise/fall time (20% to 80%)	ps	-	120	200
Operating temperature range	<sup>o</sup> C	+10	-	+35
Power	AC 100-250v (50-60Hz), < 50VA			
Remote Control	GPIB, IEEE488.2 compatible			
Weight	4.7 kg			
<b>Notes</b>				
1. Internal clock(s) are fixed frequency set during manufacture				
2. User selectable patterns, 2 <sup>7</sup> -1 and 2 <sup>23</sup> -1 in accordance with CCITT				
3. All data and clock inputs and outputs have SMA connectors				
4. Data outputs are non return to zero (NRZ)				
5. 50Ω Load connected to data output				
6. Pattern sync only on 2 <sup>7</sup> -1 pattern length				
7. Measured on Agilent 86100A, clock output used to synchronise measurement				

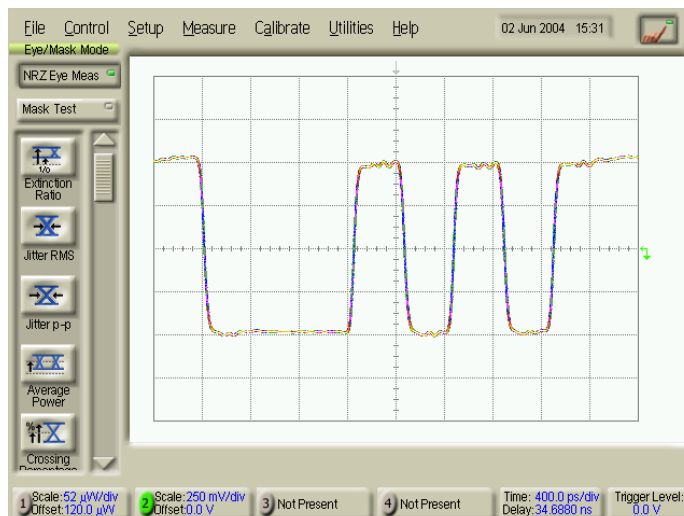
The LA19-01-03 provides a pseudo random binary sequence (PRBS) synchronised to either an internal or external clock. It provides three types of synchronisation output signals, Clock, Clock/16, and Pattern. The clock is a square wave with a typical amplitude of  $1.0 v_{pp}$ . The clock/16 is derived from the clock signal by means of low noise dividers. The typical amplitude of this is  $1 v_{pp}$ . The pattern synchronisation output produces an output synchronised to the length of the PRBS sequence selected. This allows, for example, the individual data bits to be observed on a sampling oscilloscope. It is available on the  $2^7-1$  pattern length setting.



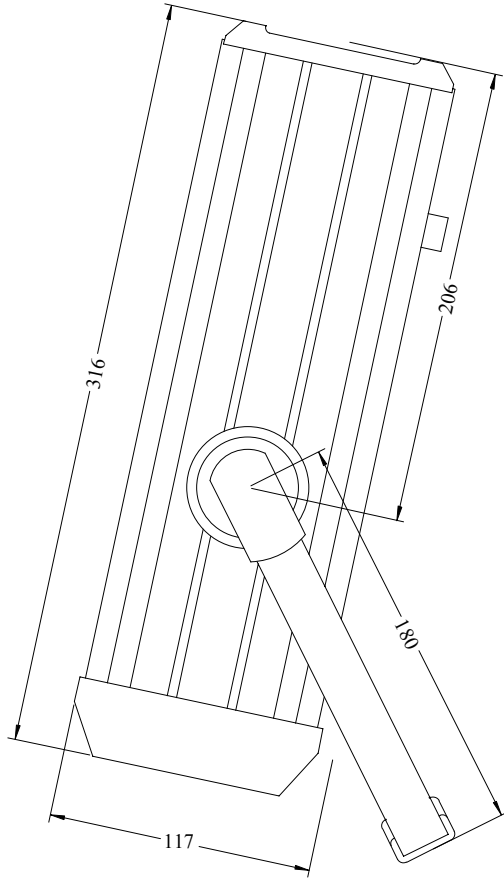
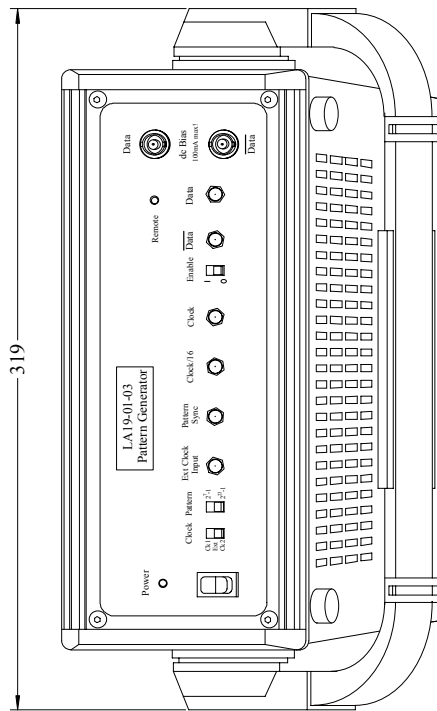
### 2.5 Gb/s, $2^{23}$ Pattern Eye Diagram

The data output provides differential outputs, each at  $1 v_{pp}$  with fast transitions of 45 ps. The output level can be boosted externally using one of LA Techniques' wideband amplifiers. For example, the LA32-04-03 will provide an output of  $7 v_{pp}$  into  $50 \Omega$  with a resulting rise time of 50 ps.

A dc offset can be added to each of the data outputs by means of the internal bias-Ts. These can handle a maximum dc voltage of  $\pm 15 v$  at  $\pm 100 mA$ . At high bias currents, a voltage drop will occur due to the internal dc resistance of the bias-T. This is typically  $18 \Omega$ .



### 2.5 Gb/s Output Using Pattern Synchronisation



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*Contact*

**Ordering information:**

LA19-01-03 Pattern generator

Clock1 xx GHz (xx is frequency in the range 0.15 to 3.0 GHz)

**Option :**

Clock2 xx GHz (xx is frequency in the range 0.15 to 3.0 GHz)

Dimensions in mm      Manufactured in the UK  
 Specification subject to change without notification