



# Agilent 81101A

## 50 MHz One-Channel Pulse Generator

Data Sheet



### Key Features

- Agilent 8110A user interface.
- Variable transitions.
- Up to 10 Vpp (20 Vpp) into 50  $\Omega$ .
- 3.5 digits timing resolution, best case 5 ps.
- 0.01% frequency accuracy.
- Fully SCPI programmable.
- Broad range of trigger and synchronization capabilities.
- Dropout and glitch free change of any timing parameters.
- 8.9 cm height, full rack width.
- Graphical display.

### Agilent 81100 Family of Pulse/Pattern Generators

The Agilent Technologies 81101A pulse generator belongs to the 81100 family. All members have the same programming and user interfaces that are compatible with the well-established Agilent 8110A. Migration is therefore easy and cost effective.

### Signals for testing digital designs and components

The 81101A generates all of the standard pulses needed to test current logic technologies (CMOS, TTL, ECL, etc.);

- Variable pulse parameters.
- Can be triggered in synchrony.

### Glitch-free timing changes

Now you can sweep your timing values without the danger of spurious pulses or dropouts that could cause measurement errors (applies to continuous mode, values < 100 ms, consecutive values between 0.5 and twice the previous value).

### Reliable measurements

The 81101A provides clean, accurate pulses with excellent repeatability, thus contributing to measurement integrity.

### Easy to use

Features such as the clear graphical display, autoset, help, store/recall, preset TTL/ECL levels, selectable units (such as current/voltage, width/duty-cycle), and load compensation ensure a high level of convenience.

### Smooth integration into automated test systems

The 81101A can be integrated easily into all phases of test system development, such as planning, rack integration, and test program generation. Test programs are 100% upwardly compatible to the 81104A and 81110A, ensuring that growth with future needs is just as easy as exchanging the instruments themselves. This results in low integration costs, in addition to low costs of ownership, through proven hardware reliability.



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## Specifications

Specifications describe the instrument's warranted performance. Non-warranted values are described as typical. All specifications apply after a 30-minute warm-up phase with 50 Ω source/load resistance and separate channels. All specifications are valid from 0°C to 55°C ambient temperature.

## Timing Characteristics

Measured at 50% amplitude at fastest transitions, in continuous mode, and 50 Ω source impedance.

Mainframe	Agilent 81101A
<b>Frequency range</b>	1 mHz to 50 MHz
<b>Timing resolution</b>	3.5 digits, 5 ps best case
<b>RMS jitter (period, width, delay)</b>	
With PLL	± 0.001% ± 15 ps
With VCO <sup>[1]</sup>	± 0.01% ± 15 ps
<b>Period range</b>	20 ns to 999.5 s
Accuracy with PLL	± 0.01% (± 5%) <sup>[1]</sup>
<b>Width range</b>	10.0 ns to (period - 10.0 ns)
Accuracy	± 5% ± 250 ps <sup>[2]</sup>
<b>Additional variable delay range</b>	0 ns to (period - 20 ns)
Accuracy <sup>[3]</sup>	± 5% ± 1 ns
<b>Double pulse delay range</b>	(width + 10.0 ns) to (period - width - 10.0 ns)
Accuracy	± 5% ± 500 ps
<b>Transition time range (10/90)</b>	5 ns to 200 ms variable
Accuracy	± 10 % ± 200 ps
Linearity	3% typ. for transitions > 100 ns

[1] If the startable oscillator (VCO) is used (PLL not active).

[2] Changing of amplitude may add 0.5 ns.

[3] Width accuracy specification is valid up to 5.5 Vpp amplitude. Above this amplitude, the width will typically increase up to 300ps.

**Burst Count:** 2 to 65536 (single or double pulses).

**Delay:** Delay, phase, or % of period.

**Double pulse delay:** Double pulse and delay are mutually exclusive.

**Duty cycle:** Set between 0.1% and 95% (subject to width limits; 99.9% with overprogramming).

**Transition times:** These can be entered as leading/trailing edge or % of width. Leading and trailing edges are independent within one of the following overlapping segments (1:20 ratio):  
5 ns - 20 ns, 10 ns - 200 ns,  
100 ns - 2 μs, 1 μs - 20 μs,  
10 μs - 200 μs, 100 μs - 2 ms,  
1 ms - 20 ms, 10 ms - 200 ms.

**Output timing fidelity:** Period, delay, and width are continuously variable without any output glitches or dropouts.

**Repeatability:** Is typically four times better than accuracy.

## Level/Pulse Performance Characteristics

Level specifications are valid after a 30 ns typical settling time.

Agilent 81101A		
<b>Amplitude</b>	50 $\Omega$ into 50 $\Omega$ 1 k $\Omega$ into 50 $\Omega$	100 mVpp to 10.0 Vpp 200 mVpp to 20.0 Vpp
<b>Level window</b>	50 $\Omega$ into 50 $\Omega$ 1 k $\Omega$ into 50 $\Omega$	-10.0 V to +10.0 V -20.0 V to +20.0 V
<b>Accuracy</b>	50 $\Omega$ into 50 $\Omega$ 1 k $\Omega$ into 50 $\Omega$	$\pm$ (3% + 75 mV) $\pm$ (3% + 150 mV) <sup>[1]</sup>
<b>Resolution</b>	50 $\Omega$ into 50 $\Omega$ 1 k $\Omega$ into 50 $\Omega$	10 mV 20 mV
<b>Output connectors</b>	BNC single-ended	
<b>Source Impedance Accuracy</b>	Selectable 50 $\Omega$ or 1 k $\Omega$ Typ. $\pm$ 1%	
<b>Max. external voltage</b>	$\pm$ 24 V	
<b>Short circuit current</b>	$\pm$ 400 mA max.	
<b>Base line noise</b>	10 mV RMS typ.	
<b>Overshoot/preshoot/ringing</b>	$\pm$ 5% of amplitude $\pm$ 20 mV	

[1] In  $\pm$ 19 V level window.

### Level parameters:

Can be entered as voltage or current, as high and low level, or as offset and amplitude.

### Load compensation:

The actual load value can be entered (for loads  $\neq$  50  $\Omega$ ) to display actual output values.

### On/off:

Relays connect/disconnect output (HiZ).

### Normal/complement:

Selectable

### Limit:

Programmable high and low levels can be limited to protect the device-under-test.

## Trigger Modes

### Continuous:

Continuous pulses, double pulses, or bursts (single or double pulses).

### External triggered:

Each active input transition (rising, falling or both) generates a single or double pulse or burst.

### External gated:

The active input level (high or low) enables pulses, double pulses, or bursts. The last single/double pulse or burst is always completed.

### External width:

The pulse shape can be recovered, while period and width of an external input signal are maintained. Levels and transitions can be set.

### Manual:

Simulates an external input signal.

### Internal triggered:

Internal PLL replaces an external trigger source.

## Inputs and Outputs

### Clock input/PLL reference and external

**input:** One input (BNC connector at rear panel) is used for clock input or alternatively for the PLL.

**PLL Reference:** The internal PLL is locked to an external 5 MHz or 10 MHz reference frequency.

**Clock input:** The output period is determined by the signal at CLK input

**Ext. input:** Used for trigger, gate, or external width.

**Input impedance:** 50  $\Omega$ /10 k $\Omega$  selectable

**Threshold:** -10 V to +10 V

**Max. input voltage:**  $\pm$ 15 Vpp

**Sensitivity:**  $\leq$ 300 mVpp typical

**Input transitions:** <100 ns

**Frequency:** Dc to 50 MHz

**Minimum pulsewidth:** 10 ns

### Strobe output and trigger output

**Strobe:** Marks the beginning of each burst

**Trigger format:** One pulse per period with 50% duty cycle typical

**External mode:** 9 ns typical

**Level:** TTL or ECL selectable

**Output impedance:** 50  $\Omega$  typical

**Max. external voltage:** -2 V/+7 V

**Transition times:** 1.0 ns typical for TTL, 600 ps typical for ECL

### User Interface

**Overprogramming:** Values can be entered, exceeding the specified range, to fully exploit the hardware limits.

**Setting check:** Warning messages indicate potentially conflicting parameters due to inaccuracy. Error messages indicate conflicting parameters.

**Help key:** Displays a context sensitive message.

**Autoset key:** Resolves all timing conflicts.

**Non-volatile memory:** The current setting is saved on power-down. Up to nine user settings and one fixed default setting are stored in the instrument.

**Memory card:** 99 settings can be stored on a 1 MB PCMCIA card (MS-DOS).

**Remote Control:** Operates according to IEEE standard 488.2, 1987 and SCPI 1992.0

**Function Code:** SH1,AH1,T6,L4,SR1,RL1,PP0,DC1,DT1,C0

**Programming times:** All checks and display off

ASCII command	Typical exec. time
One parameter or mode	30 ms typical
Recall setting	250 ms typical

### Typical delay times Agilent 81101A

Instrument mode	From	To	Typical value
External width	EXT. INPUT	STROBE/TRIGGER OUT	8.5 ns
		OUTPUT 1/OUTPUT 2	22.5 ns
All other modes	EXT. INPUT/CLK INPUT	STROBE/TRIGGER OUT	12.0 ns
		OUTPUT 1/OUTPUT 2	29 ns
	STROBE/TRIGGER OUT	OUTPUT 1/OUTPUT 2	17 ns

**General**

**Operating temperature:** 0°C to +55°C

**Storage temperature:** -40°C to +70°C

**Humidity:** 95% r.h. up to 40°C ambient temperature

**EMC:** Conforms to EN50082-1, EN 55011, Class B

**Noise emission:** 5.7 bel typical

**Battery:** Lithium CR2477-N

**Safety:** IEC1010, CSA1010

**Power requirements:**

100-240 Volts ac, ± 10%, 50-60 Hz

100-120 Volts ac, ± 10%, 400 Hz

**Power consumption:** 300 VA max.

**Max. dimensions (H x W x D):**

89 mm x 426 mm x 521 mm

**Weight:** 9.2 kg net, 13.8 kg shipping

**Recalibration period:** One year recommended

**Warranty:** Three years standard

## Ordering Information

Each Agilent 81101A includes just one output channel (in comparison to the other models of the 81100A family).

The English Quick Start Guide (81101-91010) and Reference Guide (81101-91011) are supplied with each instrument for all configurations. A memory card is not included.

**81101A** 50 MHz one-channel Pulse Generator, 10V

### Accessories

**Opt UN2** Rear Panel Connectors (instead of front panel)  
**Opt 1CP** Rack Mount and Handle Kit (5063-9219)  
**Opt 1CN** Handle Kit (5063-9226)  
**Opt 1CM** Rack Mount Kit (5063-9212)  
**Opt 1CR** Rack Slide Kit (1494-0059)  
**Opt UFJ** 1 MB SRAM Memory Card (0950-3380)  
**15104A** Pulse Adder/Splitter

### Quick Start Guide language options

**Opt ABF** French Guide (81101-91210)  
**Opt ABJ** Japanese Guide (81101-91510)  
**Opt AB0** Taiwan Chinese Guide (81101-91610)  
**Opt AB1** Korean Guide (81101-91710)  
**Opt AB2** Chinese Guide (81101-91810)

### Additional documentation options

**Opt 0BW** Service Manual (81101-91021)  
**81101-91031** Service Documentation (Component Level)

### Support Options

**Opt 1BP** MIL Std. 45662A Calibration with Test Data  
**Opt UK6** Commercial cal. certificate  
**Opt W32** 3 Year Customer Return Calibration Coverage  
**Opt W34** 3 Year MIL Calibration Service  
**Opt W50** 5 Year Customer Return Repair Coverage  
**Opt W52** 5 Year Customer Return Calibration Coverage  
**Opt W54** 5 Year Customer Return Calibration Coverage

## Related Literature

	Pub. Number
<i>Agilent Family of Pulse/Pattern Generators</i> , brochure	5980-0489E
<i>Agilent 81100 Family of Pulse/Pattern Generators</i> , data sheet	5980-1215E
<i>Agilent 8110A Pulse/Pattern Generator</i> , data sheet	5980-1212E
<i>Agilent 8114A 100V/2A Programmable Pulse Generator</i> , data sheet	5980-1213E
<i>Agilent 8133A 3 GHz Pulse Generator</i> , data sheet	5980-1214E
<i>Radar Distance Test to Airbourne Planes</i> , product note	5968-5843E
<i>The Dual Clock Gbit Chip Test</i> , product note	5968-5844E
<i>Magneto-Optical Disk Drive Research</i> , product note	5968-5845E
<i>Simulation of Jittering Synchronization Signals for Video Interfaces</i> , product note	5968-5846E
<i>Electronic Functional Test of the Consolidated Automated Support System (CASS)</i> , case study	5968-5998E

For more information, please visit us at:  
[www.agilent.com/find/pulse\\_generator](http://www.agilent.com/find/pulse_generator)

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### Our Promise

"Our Promise" means your Agilent test and measurement equipment will meet its advertised performance and functionality. When you are choosing new equipment, we will help you with product information, including realistic performance specifications and practical recommendations from experienced test engineers. When you use Agilent equipment, we can verify that it works properly, help with product operation, and provide basic measurement assistance for the use of specified capabilities, at no extra cost upon request. Many self-help tools are available.

### Your Advantage

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