KEITHLEY

3401-F

The Keithley 3401-F is a high-performance single-channel Pulse/Pattern Generator belonging to the Keithley Series 3400. Operating up to 165 MHz, it provides extensive and flexible control over pulse parameters such as amplitude, rise/fall times, width, and duty cycle. Designed in a 2U full-rack form factor, it features USB and GPIB interfaces, making it ideal for nanotechnology research, semiconductor design, and RF device characterization.

SPECIFICATIONS

General

Interfaces	GPIB, USB
Display	Color graphic LCD
Warm-up Time	30 minutes

Physical

Power Supply	100 V to 240 V AC (±10%), 47 Hz to 63 Hz, 120 VA maximum
Operating Temperature	0 °C to 50 °C °C
Dimensions (W×H×D)	439 mm × 88 mm × 375 mm mm
Weight	7.2 kg

Timing and Frequency

Frequency Range	1 mHz to 165 MHz
Period Range	6.06 ns to 1000 s

Channel and Configuration Options

Number of Channels	1
Source Impedance	50 Ω or 1 kΩ

Pulse Characteristics

Pulse Width Range	3 ns to 999.9 s
Minimum Pulse Width	3 ns
Minimum Rise Time (10% to 90%)	< 1.5 ns
Rise and Fall Times	Fixed
Pulse Amplitude (50 Ω Source Impedance)	Up to ±10 V
Pulse Amplitude (1 kΩ Source Impedance)	Up to ±20 V

Pattern Generation

Operating Modes	Pulse, burst, pattern, external width
Data Formats	NRZ, RZ, R1
Pattern Depth	4096 bits per channel
PRBS Types	PRBS 2^7-1, 2^9-1, 2^11-1, 2^15-1, 2^23-1, 2^31-1

System, Control and Interfaces

Programming Command Language	SCPI

Power and Physical Specifications

Form Factor	2U full-rack
Line Voltage Range	100 V to 240 V AC (±10%)
Line Frequency Range	47 Hz to 63 Hz
Maximum Power Consumption	120 VA

Environmental and Compliance

Storage Temperature Range	-20 °C to 60 °C

Timing & Resolution

Period Resolution	10 ps or 6 digits
Delay Range	0 ns to 999.9 s
Delay Resolution	10 ps or 5 digits
Pulse Width Resolution	10 ps or 5 digits
Duty Cycle Range	0.1% to 99.9%
Period Jitter	< 0.01% + 15 ps RMS
Width Jitter	< 0.01% + 15 ps RMS
Delay Jitter	< 0.01% + 15 ps RMS

Transitions

Transition Time Range	< 1.5 ns fixed

External Input & Trigger

External Input Impedance	50 Ω or 10 kΩ (selectable)
External Input Threshold Range	-10 V to +10 V
External Input Maximum Voltage	±15 V
External Trigger Minimum Pulse Width	3 ns

Reference Clock

Reference Clock Input	10 MHz
Reference Clock Output	10 MHz

Physical Connections

Output Connector Location	Front Panel
Connector Type	BNC

Pulse/Pattern Outputs

Amplitude Accuracy	±(1% of setting + 20 mV) (50 Ω source into 50 Ω)
Amplitude Resolution	10 mV (50 Ω source into 50 Ω)
Offset Range (50 Ω Source into 50 Ω)	-2.00 V to +2.00 V
Offset Range (50 Ω Source into High-Z)	-4.00 V to +4.00 V
Offset Resolution	10 mV (50 Ω source into 50 Ω)
Offset Accuracy	±(1% of setting + 20 mV) (50 Ω source into 50 Ω)

Auxiliary Inputs & Outputs

Trigger Output Levels	High level > 1.0 V, Low level < 0.1 V (into 50 Ω)
Trigger Output Impedance	50 Ω nominal
Reference Clock Input Frequency	10 MHz ± 10 kHz
Reference Clock Input Level	100 mVpp to 5 Vpp
Reference Clock Output Frequency	10 MHz
Reference Clock Output Level	1 Vpp nominal (into 50 Ω)

Interfaces

Front-panel USB Port	USB 2.0 Host (Type A) for saving/recalling setups and patterns

TECHNOLOGY

Pulse and Pattern Generation

APPLICATIONS

Nanotechnology research, semiconductor and RF device design and development, serial data pattern simulation