



## SF2000 HIGH VOLTAGE PATTERN AND PULSE GENERATOR

The Signal Forge 2000 Pattern and Pulse Generator is a high voltage signal source with both pulse and pattern operating modes. The pattern-based pulse mode featured on the SF2000 is much more capable than common pulse generators which only generate simple pulse bursts.

The SF2000 may be operated from the front panel, or from a PC with the PulseWave software supplied with the unit. PulseWave runs on Windows 7, Vista, XP and 2000. PulseWave is not available for OSX. In addition, the SF2000 supports the SCPI (Standard Commands for Programmable Instruments) programming interface which allows for easy integration with many automated test environments.

## KEY FEATURES

- Voltage range 3.3V to 20 V into high impedance, 1.65V to 10V into 50 Ohms
- Pattern and pulse modes

- Pattern bit period 20ns to 42s with 10ns resolution, 16k deep per channel
- Pattern-based pulse generation
- Pulse width 10ns to 42s with 10ns resolution
- 3 channels in base model, expandable to 9
- Independent channel operation (e.g. pulse period & width, trigger source, etc.)
- Adjustable channel skew up to 16.77ms in 250ps steps
- Trigger on edge or level (any polarity), internal interval, software, or manually using button on front panel
- Pattern runs once or looped
- Single-step mode triggers per pattern bit (including pulse mode)
- Save / load nine user-defined settings
- Auto Start loads any one of nine user-defined settings at power up
- Control via Front Panel, PC using PulseWave software (provided) or your test program
- SCPI programming interface for integration with test environments such as LabView™.



## APPLICATIONS

The SF2000's high voltage and high power capability make it ideal for numerous applications such as:

- Sensor testing and sensor simulation
- Low data-rate communications
- Digital stimulus testing
- Portable, bench top and ATE system applications

## PULSEWAVE SOFTWARE

PulseWave is a Microsoft® Windows® compatible program supplied with every SF2000. It provides simple intuitive control of the SF2000. PulseWave features include:

- Support for all SF2000 operations
- Save or restore patterns to/from files
- Save and restore settings from SF2000 flash
- Edit patterns in many modes (binary, hex, ON/OFF count)
- Force an output high/low
- Arm and trigger channel(s) simultaneously from your PC
- View channel status (armed, triggered, running, done)
- Multiple-channel parameter editing and viewing
- SCPI command history which may be copied to a text file for review or use in a user-developed test program
- Update firmware

## PROGRAMMING INTERFACE

- The SF2000's instrument programming interface complies with the IEEE488.2 and SCPI-1999.0 standards.
- The IEEE488.2-2004 (Standard Digital Interface for Programmable Instrumentation) describes how test instruments and controllers

communicate. The SCPI 1999.0 Standard Commands for Programmable Instruments (SCPI) goes beyond IEEE 488.2 to address a wide variety of instrument functions in a standard manner.

## CONNECTIONS AND CONTROLS

### Front Panel

- BNC input IN0 may be used as a trigger signal
- BNC input IN1 may be used as a trigger or gate signal, and it may be used to drive the master clock MCLK

### Indicator Lights

- Status
- Battery low (for battery-powered models)
- Charging
- ARM

### Buttons

The SF2000 may be configured and operated using the buttons on the LCD display and front panel

### Rear Panel

- BNC connectors for output channels CH0, CH1, CH2
- USB Type B connector
- On/Off button

# SPECIFICATIONS

Parameter	Description	Parameter	Description
Ambient Temperature	0C to 40C (32 to 104F)	Internal trigger interval	Min 8 MCLK cycles (80ns) to 42.9s (10ns resolution)
Pulse width range	10ns to 42.9 seconds (32-bit MCLK counter @100mhz)	Skew accuracy skew = 0, 50ns	+/- 1.0ns @25C, +/- 2.5ns over 0C – 40C
Pulse width resolution	10ns	Skew integral non-linearity	+/- 2.5ns @25C
Amplitude Range	3.3V to 20V into high impedance 1.65 to 10V into 50 Ohms	Skew step size	-0.75 to 1ns (typ 0.25ns) @25C
Amplitude Accuracy	0.2V	Inputs IN0 and IN1	3.3V (5V Tolerant) diode protected
Amplitude Resolution	0.05V	IN0 / IN1 trigger high/low time	Min 3 times MCLK plus 5ns (typically 35ns)
Output power maximum	150mA per channel	IN1 used as gate signal	No minimum high / low time
Rise/fall times	3ns (5V 1 MHz into 50 ohms) 7ns (20V 1µs pulse into 50 ohms)	User-driven clock (IN1) rate	Multiplied by 10 to become MCLK. IN1 must be 500khz – 10mhz.
Pulse period (pattern bit period)	20ns to 42.9 seconds (32-bit MCLK counter @100mhz)	Standard oscillator	Frequency tolerance 70ppm Frequency stability 15ppm over 0-35 °C ambient
Pattern depth (per channel)	16k bits	Wall outlet power supply	Input 100/ 240VAC, 50/60 Hz Output of 24 VDC and 1.5A.
Channel skew	Added delay 0 to 50ns in 250ps increments. Must disable when output high or low time is less than 40ns.	USB power used	None
Fixed trigger delay	50-80ns. Delay is 20-30ns less if skew is disabled.		
Trigger jitter (from IN0 or IN1)	10ns		
Programmable trigger delay	0ns – 167.7ms (16-bit MCLK counter @100 MHz). This delay is in addition to the fixed trigger delay.		

## PRODUCT LINE

### Pulse and Pattern Generators

**SF2000** High Voltage Pulse and Pattern Generator

### Signal Generators

SF1010 Portable Signal Generator with Remote Control (SCPI API)

SF1010E Portable Signal Generator with Remote Control (SCPI API) – External clock source required

SF1020 Battery Powered Signal Generator

SF1020E Battery Powered Signal Generator *External clock source required.*

### RF Frequency Expansion Modules

2500M Frequency Expansion Module. RF frequency output 1.5 GHz to 2.6 GHz  
Add-on to Attaches to SF1000 and SF1020

1800M Frequency Expansion Module. RF frequency output 950 MHz to 1.8 GHz  
Add-on to Attaches to SF1000 and SF1020

### Software and Accessories

PulseWave Windows-based control application for the SF2000 Pulse and Pattern Generator  
(free download from [www.signalforge.com](http://www.signalforge.com))

EZ Wave Windows-based control application for SF1010  
(free download from [www.signalforge.com](http://www.signalforge.com))

EZ Terminal Serial Terminal software for SF1000 and SF1020  
(free download from [www.signalforge.com](http://www.signalforge.com))

SF-BRK1 U Rack Mount Bracket.

Holds 3 SF1000 or SF1010 units and mounts in a standard 19 in. rack

## ORDERING INFORMATION

Products may be purchased directly from the Signal Forge web site at [www.signalforge.com](http://www.signalforge.com).

**Purchase Orders** may be submitted via email to [sales@signalforge.com](mailto:sales@signalforge.com) or fax to 512-275-3735.

**For quotes**, please send a request for quote to Signal Forge sales at [sales@signalforge.com](mailto:sales@signalforge.com) or call 512-275-3733, option 1.

## CONTACT INFORMATION

Signal Forge, LLC  
2115 Saratoga Dive  
Austin TX 78733 USA

Web [www.signalforge.com](http://www.signalforge.com)  
Email Sales and Customer Service – [sales@signalforge.com](mailto:sales@signalforge.com)  
Technical Support – [support@signalforge.com](mailto:support@signalforge.com)  
Phone 512.275.3733 Fax 512.275.3735