PULSE
RIDER >>

- 70 ps Edge Time
- 5 V pk-pk Output Voltage Range
- Min Pulse Width less than 300 ps
- Dual and Quad Channels Systems
- SimpleRider™ touch User Interface

Time to Reinvent
Pulse Generators

70 @ **5**
ps   Vpp

The **Pulse Rider Series** offers premium signal integrity with the easiest to use touch screen display interface (**SimpleRider**™).

The Generation of pulses requires only a few screen touches.

The output Voltage can be adjusted up to 5 Volts pk-pk in a window of ±5 Volts with 70 ps edge rate (based on **RiderEdge**™ technology) and transitions with minimal overshoot and ringing.

Its innovative hardware architecture provides the possibility to generate multiple pulse sequences, such as **double, triple** or **quad pulses**, with fully independent timing parameters.

AT Active Technologies

Technology
## Re-Inventing the Pulse Generation

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Rider FastEdge™

First to market low cost Analog edge converter with the ability to reach less than 70 ps edge (20-80%) at 5 volts @ 50 ohms with fully adjustable output voltage.

FastEdge technology is lower in cost of any competitive solution and well prepared to be combined with more innovations in terms of edge variability and dynamic range expansion for specific applications.

FastEdge technology is patented and it will boost **Active Technologies** leadership in signal generation providing an excellent platform of components for the components for today's and future market of Modern Pulse and Signal Generators.
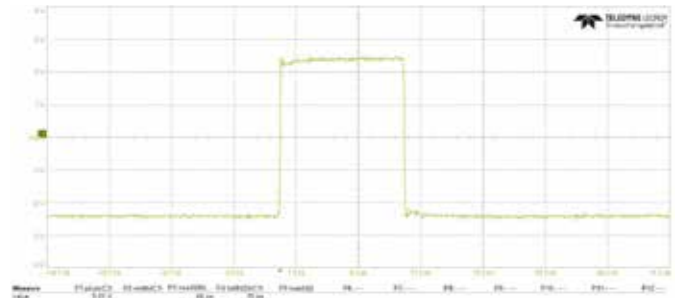
Rider FastEdge:™ : *Rise/Fall Time 70ps@5Vpp*

Simple Rider™

SimpleRider UI is designed for touch to drive simplicity in operating with a pulse generator, by optimizing the today's modern technique, used on Tablet or smart phones, of capacitive touch screen display.

All important instrument controls and settings are always one touch away: swipe gesture to change the channel, pulse selection and have access to its main parameters, generate multiple pulses easily, use the touch-friendly virtual numeric keyboard to change parameter values on the fly.

Finally a display interface is offered that will become familiar in less than a minute: the pulses will be generated quickly, adjustments can be done lively, set-up are at one touch.
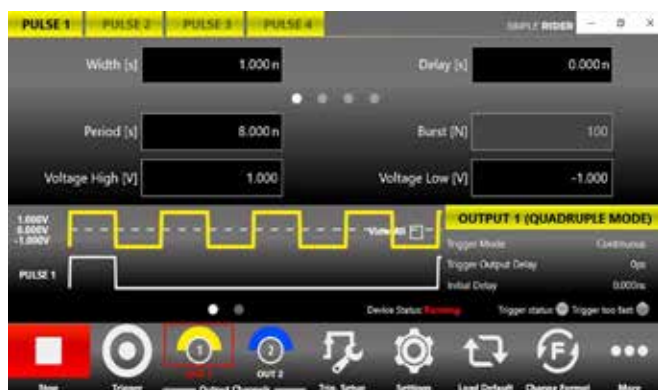
AWG, AFG and Pulse Rider Series products are equipped with the same Simple Rider UI to share the same benefits with different users and applications.

SimpleRider™ *Pulse Rider User Interface*

The Pulse Rider is equipped with the External Width Mode feature: it allows to make edges stepper than those of the source taking advantage of the RIDER Fast Edge technology.

SimpleRider™ *Quadruple Pulse Mode*

SimpleRider™ *External Width Mode*

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Application **AREAS**

Big Physics Applications

Physics applications have a perfect match with the Rider generator series and in particular with the Pulse Rider Generator.

The combination of fast edge generation, excellent dynamic range and easy to use user interface go perfectly on large experiments areas such Experiments colliders, Lasers modulation, detectors and strips silicon emulation.

High Energy/Voltage Semiconductors system for collider's applications can be modulated and tested thanks to the Pulse Rider patterns.

Lasers applied for Plasma Physics experiments may require modulating pulses down to less than 100 ps.

There are several large experiments where Pulse Rider can be the perfect solution to combine high-speed transition time with high channels density (4 channel in just 3U – 19" rackmount).

Pulses may be also used in mass spectroscopy applications to test TOF (time of flight) systems and in chemistry application to easily prove functionality.

CERN - *Assembling the last module of the vertex locator for LHCb. Photograph: Maximilien Brice. © 2007-2016 CERN. All Right Reserved.*

Military Radar and Sonar applications

Army/Navy may also require fast pulse generation for testing or emulation.

Radar or Sonar systems perfectly match with these generators to better test and prove complex detection systems.

Pulse Rider is a good fit for areas where a large amount of channels is required and the cost of DAC solutions are too high and too complex to be managed.

ATI Electromagnetic systems largely used in military applications may be tested by Rider Series Generators.

Pulses may be easily generated for applications such Pulse Electron Beam or X Ray Sources, Flash X-ray Radiography, Lighting pulse simulators, high Power Microwave modulators.

SONAR - *Sonar image of shipwreck of the Latvian Naval Forces ship Virsaitis in Estonian waters.*

Semiconductors Test

Speed of modern Silicon is imposing high quality and high fidelity test systems.

Today's patterns generators offer a good combination of performance but limited in edge speed and dynamic range.

Pulse Rider, for the first time, offers both high speed and high dynamic range, combined with an easy to use interface and pulse mixing capabilities in one or multiple channels.

This is excellent to test components and provide the right performance to test and prove specs to validate integrated circuits. DTG functionality may be created by synchronizing one or more Pulse Riders units (4 Channels each).

The Rider series offers also, in the AWGs, digital outputs to be used for digital pattern generation.

Re-Inventing the Pulse Generators
EASE of use combined
with POWERFUL performance

1 Touch Screen display and Soft Keyboard

The new Rider Series delivers **7" capacitive** touch screen display to the mainstream waveform generator market for the first time.

The touch-screen friendly **SimpleRider**™ software allows users to generate pulses quickly by a few screen touches.

The UI ergonomic approach is well balanced to offer multiple ways to operate the instrument by offering a complementary soft keyboard and a useful central knob for fine-tuning and adjustments during the set up operation.

Standard configurations may be stored on the system memory for easy configuration recalls.

2 2-4 Channels Pulse Generator

Multiple pulses generation is always available with the basic **Dual Channel** version or with the **Quad Channel** version.

Each channel may generate pulses with rise time as low as 70 ps, thanks to the **RiderEdge**™ amplifier, and frequency repetition rate from mHz to 500 MHz.

Output Voltage is fully adjustable up to 5 Volts pk-pk inside a voltage window of ±5 Volts.

The new family of **RiderPulse**™ Generator can produce Multiple output pulses (double, triple, quad) with independent repetition rate, width, delay, amplitude and polarity.

This gives the possibility to use the instrument as a digital delay generator for rescaling, synchronizing, delaying, gating and triggering multiple devices with respect to one unique event.

Touch Gesture

The output channels can be combined in order to generate multiple pulses (i.e. double pulse, quad pulse) each of them with independent timing parameters (delay, width, repetition rate).

3   Trigger, view, generate and sync

Trigger events may be generated internally or captured by an external trigger source or remotely from Ethernet or GBIP connections.

The trigger output may be delayed according to the application and then, thanks to the **RiderEdge**™ technology, amplified to increase the voltage dynamic from small signals inputs.

Trigger in and Trigger out may be used to synchronize multiple units to obtain several pulses and to provide a perfect solution for specific Big Physics or Military applications.

The large dynamic range combined with the fast edge rate represents a great solution for semiconductor testing as well.

Active Technologies has a long knowledge in this application areas and provides specific products to complement the Rider Generator series.

4   SimpleRider Pulse Touch User Interface

Simple Rider UI is designed for touch and it has been developed to put all the capabilities of the modern Pulse and Waveform Generators right at your fingertips.

All instrument controls and parameters are accessed through an intuitive UI that recalls the simplicity of Tablets and modern smart phones: touch features and gestures are available to engineers and scientists to create single or multiple pulses in few touches.

- The swipe gesture gives easy access to the output and pulse parameters.

- A touch-friendly virtual numeric keypad has been designed to improve the user experience on entering the data.

- Time saving shortcuts and intuitive icons simplify your setup also during pulse combination operations.

Pulse Rider supports the most common interfaces for remote control (Ethernet, GPIB) for easy customized instrument programming.

SimpleRider Touch UI is available on all the instruments of the Rider Series product family.
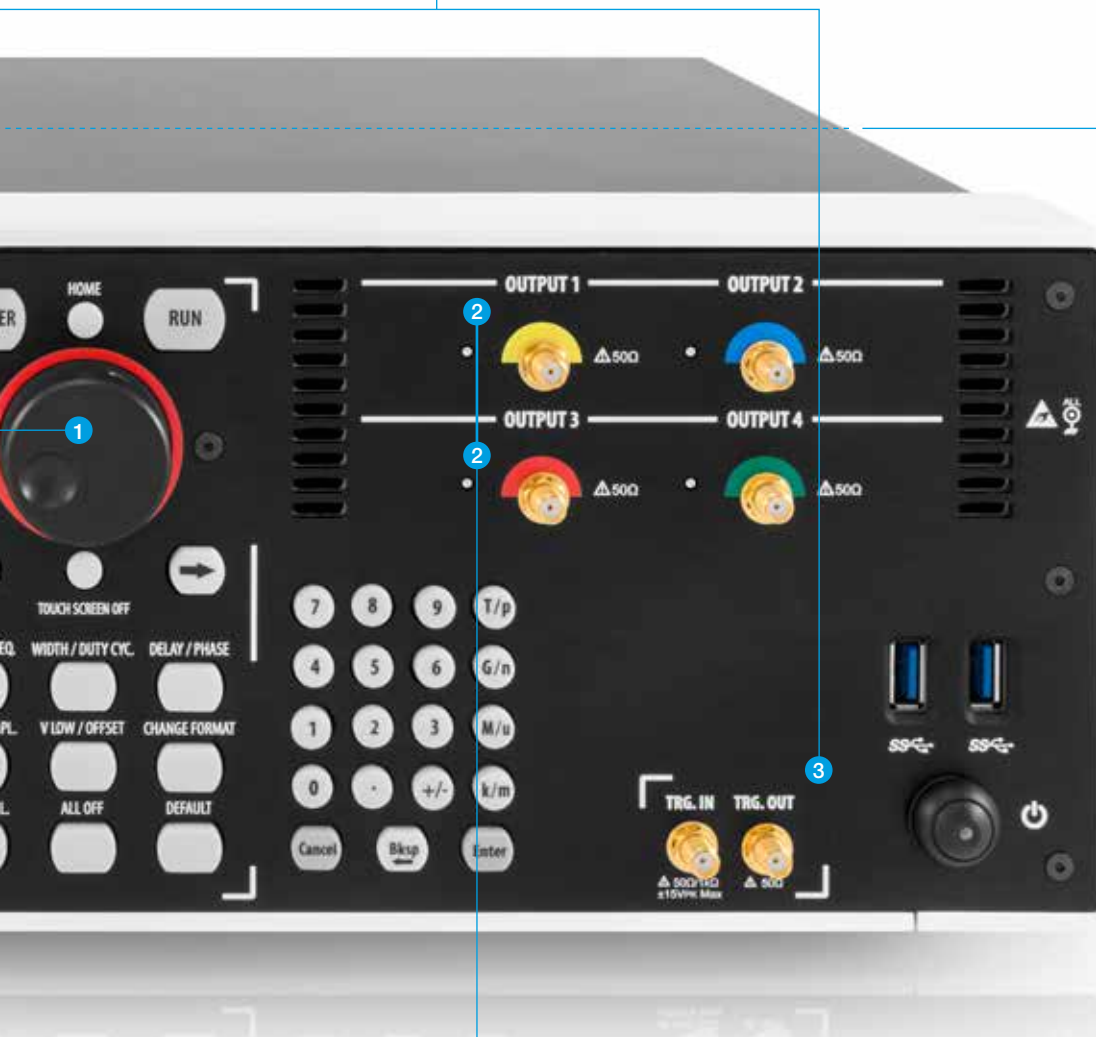
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Tools for
the Field Engineer

SDK Package

Active Technologies provides the Software Development Kit you need to automate your tests and measurements on the field.

The SDK is based on ASCII SCPI commands that let you to connect to a powerful graphical programming environment like LabView™, take advantage of the visualization and programming capabilities found in MATLAB™ or use the flexibility of .NET programming languages.

The SDK package contains documentation along with several examples that can be directly downloaded from **Active Technologies** website www.activetechnologies.it

Laser Drivers

In big physics experiments photomultipliers are fundamental since they allow to convert photons in electric charge that can be received by the acquisition system allowing the detecting photons.

The emission of photons can be correlated to a specific phenomenon studied by physicians like the Cherenkov effect.

Using **Active Technologies** Pulse Rider PG-1000 Series pulse generators it is possible to generate a pulse with different width, period and amplitude.

It is very fast and easy setting a single pulse put the instrument waiting for external trigger-in or generate pulses in continuous way.

PG-1074 Pulse Generator

OUT. 1

OUT. 2
Sync. Signal

LASER DRIVER
EXT. TRIG

OSCILLOSCOPE
EXT. TRIG
Ch.1   Ch.2

LASER HEAD

PHOTOMULTIPLIER / CHARGE AMPLIFIER

Figure 1 *Principle scheme of set-up for the photomultiplier / charge amplifier test and characterization.*

Klystron Control and Synchronization

A klystron is a specialized linear-beam vacuum tube that can be used in multiple applications, as example in the colliders used for big physics experiments, it has the purpose to generate the particles that will collide.

Klystron

Like for the laser applications, it is necessary to generate an enable signal to drive the klystron.

The **Pulse Rider PG-1000 Series** pulse generators offer an off-the-shelf solution to control and modify the klystron enable signal parameters in an easy way using the graphical interface and the touch screen display.
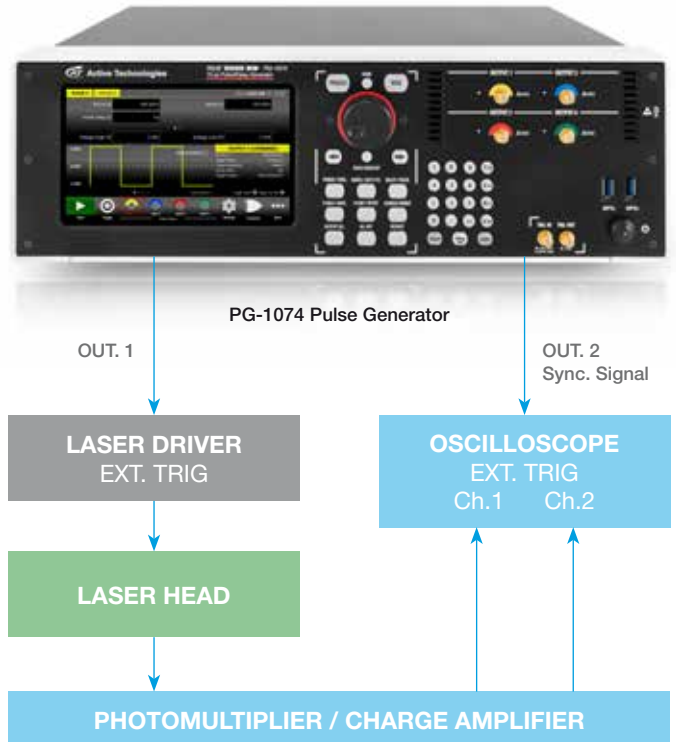

Figure 2 *Simple Rider UI, generation of two narrow pulses (5 ns) with 7.5 ns of Delay(s) one from the other.*
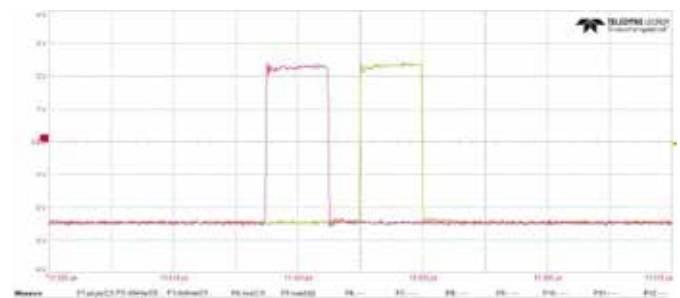

Figure 3 *Oscilloscope screen capture, generation of two narrow pulses (5 ns) with 7.5 ns of Delay(s) one from the other.*

Pulse **Rider**
SPECIFICATION

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Pulse Rider	Pulse Rider PG - 1072	Pulse Rider PG - 1074
Channel count	2	4
Amplitude pk-pk	10 mVpp to 5 Vpp Adj.	10 mVpp to 5 Vpp Adj.
Output impedance	50 Ohm nominal	50 Ohm nominal
Baseline Offset	± 2.5 V Adj.	± 2.5 V Adj.
Baseline Offset resolution	2 mV	2 mV
Amplitude Range pk-pk	10 mVpp to 5 Vpp	10 mVpp to 5 Vpp
Amplitude Absolute accuracy	± (1% of amplitude pk-pk + 1% of |DC Offset| + 10 mV)	± (1% of amplitude pk-pk + 1% of |DC Offset| + 10 mV)
Amplitude Resolution	4 mV (amplitude 250 mVpp to 5Vpp), 1 mV (amplitude 10 mVpp to 250mVpp)	4 mV (amplitude 250 mVpp to 5Vpp), 1 mV (amplitude 10 mVpp to 250mVpp)
DC amplitude accuracy	± (1% of setting + 10 mV)	± (1% of setting + 10 mV)
Rise/Fall time (10%-90%) Typ.	< 95 ps fixed	< 95 ps fixed
Rise/Fall time (20%-80%) Typ.	< 70 ps fixed	< 70 ps fixed
Overshoot Typ.	< 5%	< 5%
Max. frequency	500Mhz (quad. pulse mode)	500Mhz (quad. pulse mode)
Period range	8 ns to 8 s	8 ns to 8 s
Period resolution	10 ps	10 ps
Period accuracy Typ.	± 35 ppm	± 35 ppm
Period jitter, RMS Typ.	< 20 ps	< 20 ps
Width range	300 ps to (period – 300 ps)	300 ps to (period – 300 ps)
Width resolution Typ.	10 ps	10 ps
Width accuracy Typ.	± (0.1% + 30 ps)	± (0.1% + 30 ps)
Width jitter, RMS Typ.	< 25 ps	< 25 ps
Delay range (Trigger out to Output)	0 ps to period	0 ps to period
Delay resolution Typ.	10 ps	10 ps
Delay accuracy Typ.	± (0,1% + 30 ps)	± (0,1% + 30 ps)
Delay jitter, RMS Typ.	< 25 ps	< 25 ps
SE or Complementary output	Both	Both
Multiple pulse modes	Single, dual, triple, quadruple, external width	Single, dual, triple, quadruple, external width
Trigger mode	continuous, single, burst, gated	continuous, single, burst, gated
Trigger in threshold	programmable in 10 mV steps	programmable in 10 mV steps
Trigger in range	± 8 V	± 8 V
Trigger in min. detectable amplitude	< 50 mVpp	< 50 mVpp
Trigger in impedance	50 Ohm or 1K Ohm programmable	50 Ohm or 1 K Ohm programmable
Trigger in to output jitter, RMS Typ.	< 30 ps	< 30ps
Trigger in to output delay	78 ns	78 ns
Trigger output impedance	50 Ohm nominal	50 Ohm nominal
Trigger output range (open load)	1.8 V to 3.3 V	1.8 V to 3.3 V
Display Characteristics & OS	7 inch, 1024x600, capacitive touch LCD - Windows 10	7 inch, 1024x600, capacitive touch LCD - Windows 10
Dimensions & Weight	W 445 mm - H 135 mm - D 320 mm D (3U 19" rackmount) - 11 Kg	W 445 mm - H 135 mm - D 320 mm D (3U 19" rackmount) - 11 Kg

Active Technologies

About Active Technologies
Active Technologies is an Italian company expert in semiconductor test equipment and electronic instrumentation design.

Active Technologies

70ps @ 5Vpp | Pulse Generators

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