250 V / DIV
200 ns / DIV
into 50 Ohms

Ch1 +Width 1.005µs
Ch1 Rise 49.48ns
Ch1 Fall 38.14ns
Ch1 Ampl 705 V

- ◆ Amplitudes to 1000 Volts
- ◆ Peak powers to 1 kW
- ◆ Average powers to 5 Watts
- ◆ Pulse widths of 1 us to 1 second
- ◆ For resistances of 1Ω to ∞
- ◆ IEEE-488.2 GPIB and RS-232 interfaces

The AVR-8R pulse generator family is specifically designed for pulse-mode testing of resistors.

Model AVR-8R1-B generates pulses with amplitudes (V) of 10V to 1000V, for loads resistances (R) of 1 to ∞ Ohms, with pulse widths adjustable from 1 us to 1 second. The maximum peak power (V^2/R) that may be delivered to a resistive load R is 1000 Watts. The maximum average power (V^2/R × duty cycle) is 5 Watts. The maximum duty cycle (assuming the power limits are not exceeded) is 10%, and the maximum repetition rate is 1 kHz.

The AVR-8R2-B is similar, except it operate into loads as low as 0.1 Ohms, for amplitudes of 1V to 1000V.

The during the output pulse, the output voltage will droop at a rate given by V / (R × 150 uF), approximately. To ensure a droop of less than 10%, the maximum pulse width for resistance R should be limited to PW = R x 15 uF. For instance, for a 100 Ohm load, the pulse width should be between 1 and 1500 us.

The output circuitry will safely withstand any combination of front panel control settings, output open or short circuits, and high-duty cycles. An internal power supply monitor removes the power to the output stage for five seconds if an average power overload exists.

Aside from the internal clock, all models can also be triggered by a single-pulse pushbutton or an external TTL-level trigger input. When triggered externally, the output pulse width can be set to track the input trigger pulse width (PW_{OUT} = PW_{IN}). A delay control and a sync output are provided for oscilloscope triggering. A gate input is also provided.

Standard models are positive polarity, although negative or dual-polarity units can be provided upon request.

All models include a computer control interface (see http://www.avtechpulse.com/gpib for details). This provides GPIB and RS-232 computer-control, as well as front panel keypad and adjust knob control of the output pulse parameters. A large back-lit LCD displays the output amplitude, load resistance, frequency, pulse width, and delay. To allow easy integration into automated test systems, the programming command set is based on the SCPI standard, and LabView drivers are available for download at http://www.avtechpulse.com/labview. An Ethernet port for Telnet or web-based control is optional.

A burst mode option is also available, allowing a burst of 1-500 pulses to be generated in response to a single trigger event. For more details about this option, see http://www.avtechpulse.com/options/br.

The user must specify the desired output connector type, which can be SHV, MHV, N, HN, or BNC. BNC connectors are not generally recommended for high-voltage use.

All models require 100 - 240 V, 50 - 60 Hz, and are mounted in a rugged all-metal 3.9" x 17" x 14.8" chassis.

Many aspects of the AVR-8R instrument can be customized or adjusted for special requirements. Contact Avtech (info@avtechpulse.com) with your special test requirement!

Basic Chassis.
A Type N output connector is shown.

Model[1]:	AVR-8R1-B	AVR-8R2-B
Amplitude:	+10 to +1000 Volts	+1 to +1000 Volts
Load resistance (R) range:	1 Ω to ∞	0.1 Ω to ∞
Rise & fall times (20%-80%):	≤ 250 ns	
Pulse width (FWHM)[2]:	1 us to 1 s	
PRF: external trigger mode: internal trigger mode:	0 to 1 kHz 0.1 Hz to 1 kHz	
Maximum peak power (P_{PEAK}):	$P_{PEAK} = (V^2 / R) \le 1000$ Watts, where V is the voltage amplitude and R is the load resistance	
Maximum average power (P_{AVG}):	P_{AVG} (= P_{PEAK} x duty cycle) ≤ 5 Watts	
Maximum duty cycle:	10% (subject to the above power limits)	
Droop rate (pulse top flatness):	≈ V / (R × 150 uF)	
GPIB and RS-232 control[1]:	Standard on -B units. See http://www.avtechpulse.com/gpib for more information.	
LabView Drivers:	Check for availability at http://www.avtechpulse.com/labview.	
Internet control (Telnet & Web):	Optional[3]. See http://www.avtechpulse.com/options/tnt for details.	
Burst mode:	Optional[6]. Generates 1-500 pulses per trigger event.	
Propagation delay:	≤ 200 ns (Ext trig in to pulse out)	
Jitter (Ext trig in to pulse out):	± 100 ps ± 0.03% of sync delay	
Trigger required:	TTL pulses, 50 ns or wider	
Sync delay:	Variable 0 to ± 1 s (sync out to pulse out)	
Sync output:	+3 Volts, 100 ns, will drive 50 Ohm loads	
Gated operation:	Synchronous or asynchronous, active high or low, switchable. Suppresses triggering when active.	
Connectors:	OUT: specify SHV, MHV, N, HN, or BNC[4,5] Trig, Sync, Gate: BNC	
Power requirements:	100 - 240 Volts, 50 - 60 Hz	
Dimensions (H x W x D):	100 mm x 430 mm x 375 mm (3.9" x 17" x 14.8")	
Chassis material:	cast aluminum frame and handles, blue vinyl on aluminum cover plates	
Mounting:	Any	
Temperature range:	+5°C to +40°C	

1) -B suffix indicates GPIB-equipped model.
2) The output pulse width may also be controlled externally by applying a TTL-level trigger of the desired width to a rear-panel BNC connector (PW_{IN} = PW_{OUT} mode).
3) Add the suffix -TNT to the model number to specify the internet control option.
4) To specify, suffix the model number with "-SHV", "-MHV", "-NC", "-HN", or "-BNC" as required.
5) BNC connectors are not normally used for 1000V operation. In practice, they seem to withstand 1 kV pulses, but the other connector options are more appropriate for high-voltage use.
6) Add the suffix -BR to the model number to specify the burst mode option. See http://www.avtechpulse.com/options/br for details about this option.

The table below summarizes the effect of the various specifications limits for different load resistances:

Resistance to Test	Absolute Maximum Amplitude[7]	Absolute Maximum Duty Cycle at Maximum Amplitude[8]	Recommended Maximum Pulse Width for 10% Droop[9]
0.1 Ω (-8R2 only)	10 V	0.5 %	1.5 us
0.2 Ω (-8R2 only)	14.1 V	0.5 %	3.0 us
0.5 Ω (-8R2 only)	22.3 V	0.5 %	7.5 us
1 Ω	31.6 V	0.5 %	15 us
2 Ω	44.7 V	0.5 %	30 us
5 Ω	70.7 V	0.5 %	75 us
10 Ω	100 V	0.5 %	150 us
20 Ω	141 V	0.5 %	300 us
50 Ω	223 V	0.5 %	750 us
100 Ω	316 V	0.5 %	1.5 ms
200 Ω	447 V	0.5 %	3 ms
500 Ω	707 V	0.5 %	7.5 ms
1 kΩ	1000 V	0.5 %	15 ms
2 kΩ	1000 V	1.0 %	30 ms
5 kΩ	1000 V	2.5 %	75 ms
10 kΩ	1000 V	5.0 %	150 ms
20 kΩ	1000 V	10 %	300 ms
50 kΩ	1000 V	10 %	750 ms
≥ 100 kΩ	1000 V	10 %	1 sec

7) Determined by the 1000 Watt maximum power limit, or the 1000 V maximum amplitude limit.
8) Determined by the 5 Watt average power limit, or the 10% maximum duty cycle limit.
9) Determined by the droop rate of V / (R × 150 uF), or the 1 second maximum pulse width limit.