



## Model 4050B Pulse Generator

- 45 ps Risetime
- 10 V Amplitude
- 1.5 ps Jitter

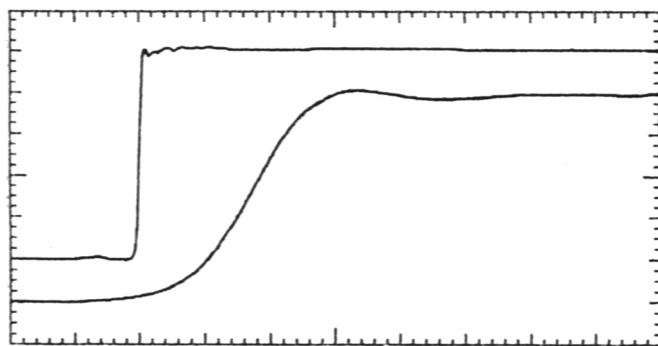


The Model 4050B Pulse Generator features an extremely fast risetime of only 45 ps with a very respectable 10 V amplitude. Special attention was given in the design to provide extremely stable pulses. The timing jitter is only 1.5 ps rms. The step waveform is very clean.

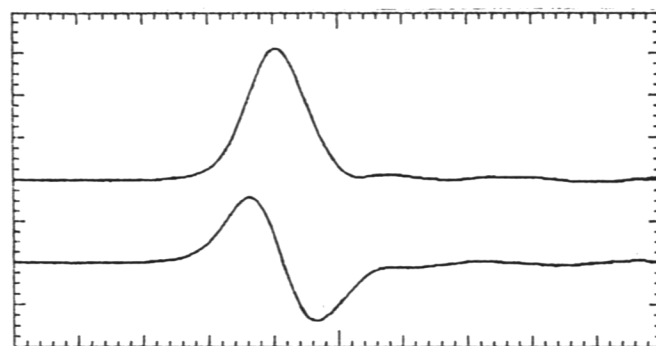
The 10 V, 45 ps pulse is generated in a remote, Fast Pulse Head module. The pulse driver is built into a 19" rack mount cabinet. A 50  $\Omega$  coax cable (1 meter in length) is supplied to connect the two units. This allows the experimenter to connect the extremely fast 45 ps pulse directly to the circuit or instrument under test. This eliminates the risetime slowing effects of interconnecting coaxial cables.

With the addition of optional accessories, other pulse waveforms may also be obtained. A negative polarity pulse can be obtained using a Model 5100 Inverting Transformer ( $t_r = 15$  ps). A 2.5 V, 50 ps (fwhm) impulse and a 1.8 V ptp, 6.5 GHz monocycle pulse may be obtained by attaching 1 or 2 Model 5210 Impulse Forming Networks to the 4050RPH pulse head output. DC offset can be accomplished with a Model 5542 Bias Tee ( $t_r = 7$  ps).

There are many applications for the 4050B. They include GaAs IC and laser diode research and measuring the transient responses of traveling wave oscilloscopes, coaxial cable and other wideband components. The 6.5 GHz monocycle is ideal for an ultra-high resolution, phase-coherent radar. The monocycle can be amplified by a traveling wave tube amplifier. See PSPL Application Note AN-9 for more details.



2 V/div, 500 ps/div and 25 ps/div  
10 V, 45 ps risetime, step pulse



50 ps/div  
2.5 V, 50 ps impulse and 1.8 V ptp 6.5 GHz monocycle

Measured by an HP-54121A, 17.5 ps rise, digital sampling scope

Parameters [1, 2]	
Amplitude into 50 $\Omega$	10 V, 9 V min.
Polarity	Positive
Baseline	0 V
Risetime	45 ps, 55 ps max.
Step Duration	10 ns
Precursor	0.5%, 1% max.
Overshoot	2%
Topline Perturbations	$\pm 2\%$ , $t < 3$ ns
Topline Flatness	$\pm 0.5\%$ , $\pm 1\%$ max., 3 ns $< t < 10$ ns
Falltime	0.5 ns, 1.5 ns max.
Source Impedance	50 $\Omega$
Reflection Coefficient	$\pm 5\%$ (during pulse) then $+80\%$ , $-40\%$ (after pulse). vswr improves with increasing attenuation.

Trigger Output and Timing	
Amplitude	10 V into 50 $\Omega$
Waveform	Exponential
Risetime	1 ns
Duration	3 ns
Delay	15 ns trig in/out, 0 to 110 ns trig out/step, adjustable in 10 ns steps.
Delay Jitter	1.5 ps rms, (3 ps rms max.)
Repetition Rate	1 MHz to 1 Hz in 6 ranges with 0.1 to 1.0 vernier.
Ext. Trigger Input Level	$> 1.5$ V, (+) slope

General Specifications	
Controls	Power, Rep. Rate/Ext. Trig., Rep. Rate Vernier, Single Pulse, Delay
Connectors	Drive pulse: SMA, Charge line In/out: SMA, Trig. In/out: BNC
Power Required	100, 115 or 230 V AC, 50/60 Hz, 22 VA (50 Hz), 17 VA (60 Hz)
Operating Environment	Indoors, 0 C to 50 C, $< 80\%$ rh
Safety Certifications	Conforms to EN-061010-1 (CE mark) UL-1244 and IEC-348. Safety class I. For lab use only by qualified personnel
EMI Certifications	Conforms to EU Directive 89/336/EEC EN55011 and EN50082-1, CE mark
Calibration	Test report with waveforms is furnished, NIST-traceable.
Warranty	One year. Exception: 30-day warranty on static sensitive 4050RPH. See 4050B manual and Terms and Conditions of Sale for details.
Accessories Included	Model 4050RPH Remote Fast Pulser Head, Model 5500 DC Block, 1 m, SMA cable, power cord, front handles and rack mount brackets, instruction manual, and video
Dimensions	3.5" x 17" x 13" (8.9 x 43.2 x 33 cm)
Weight	13 lbs (5.9 kg), 18 (8.2 kg) lbs shipping

#### Notes

[1] These are typical performance parameters as measured using an HP-54121A, 17.5 ps digital sampling oscilloscope and 30 dB, DC-26 GHz attenuator. They are only guaranteed when max. and/or min. limits are given.

[2] The step duration is set by an internal 10 ns charge line. A rear panel SMA connection is provided to allow other length external charge lines to be used (3 ns/ft.). Do not exceed 250 ns duration or 1% duty cycle. Max. rep. rate must be reduced for  $> 10$  ns duration pulses. A special version with 200ns step duration is available. Contact PSPL for details.

**CAUTION:** The semiconductors in the 4050RPH Fast Pulser Head are fragile and susceptible to damage by static discharge. Use care when handling it. Always discharge cables and loads prior to connecting to it. The 4050RPH is designed to work into a 50  $\Omega$  load or an open or short circuit. It can be damaged if an external voltage is applied. Use the supplied accessory 5500 DC Block to protect against external DC voltages. Always discharge the DC-Block prior to connecting the 4050RPH.