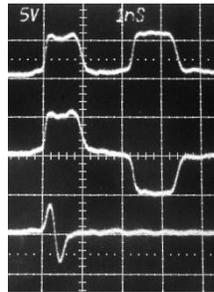


AVP-3S-C, 10V/div. Top: 500 ps/div
Bot: 100 ps/div



5 V/div, 1 ns/div

← -DPP option

← -DPN option
(large delay)

← -DPN option
(small delay)

- ◆ Rise times to 50 ps
- ◆ Amplitudes to 40 Volts
- ◆ PRF to 1.0 MHz
- ◆ Pulse widths from 0.2 to 500 ns
- ◆ Two channel option
- ◆ Double pulse options
- ◆ Stand-alone lab instruments or miniature modules
- ◆ IEEE-488.2 GPIB and RS-232 control (-B units)
- ◆ Optional Ethernet/VXI port

The AVP series of pulse generators offer the fastest rise times available in the Avtech product line, with rise times as low as 50 ps for 10V units, and 150 ps for 40V units.

The AVP-3SA family provides uniquely low rise times of 50 ps, pulse widths variable from 0.2 to 4 ns, amplitudes of up to 10 Volts, and pulse repetition frequencies of up to 1 MHz. The similar AVP-AV-1S family offers 60 ps, 5 Volt operation, and the AVP-2SA family offers 40 ps, 5 Volt operation.

The AVP-AV-1 family provides 10V pulses with 100 ps rise times. The AVP-AV-HV2 family has amplitudes to 20V, pulse widths variable from 0.3 to 2 ns (optionally 4 ns), with 100 ps rise times. These two families are also available in the computer-controllable -B format.

The high-voltage AVP-AV-HV3 family operates to 40V, with pulse widths variable from 0.4 to 2 ns (optionally 4 ns), and 150 ps rise times.

For wide-pulse applications, the AVP-AV-2 family provides output pulse widths variable from 2 to 50 ns at frequencies as high as 50 kHz. With a wide pulse option (-W500) this model will operate in the output pulse width range of 20 to 500 ns. The rise time is 100 ps.

Models with the -C or -B suffixes include an internal oscillator that is variable up to 1 MHz (to 50 kHz for AVP-AV-2 models) using the front-panel controls. A delay control and a sync output are provided for sampling scope triggering purposes. All models can also be triggered externally using a TTL-level pulse.

Either output polarity or optional dual output polarity can be provided. Separate output ports with common pulse width and amplitude controls are provided in dual-polarity AVP-3SA and AVP-AV-1S units. Only one of the two outputs is active at a time. Instruments with the "-B" computer control option have a single output port, whose polarity may be switched using the front-panel controls or by computer command. Polarity inversion in all other dual-polarity units is accomplished by manually connecting a supplied inverting transformer accessory to the main output port.

Certain models are optionally available with two outputs, each with independent pulse width and amplitude controls. The two channels share a common trigger source, and have a variable delay separation of 0 to ± 50 ns. (Other delay ranges can be provided upon request.) To specify two positive outputs, add the suffix -2CHPP to the model number. To specify two negative outputs, add the suffix -2CHNN. To specify one positive and one negative output, add the suffix -2CHPN.

Options are available which permit the generation of double-pulse (doublet) waveforms, such as those shown in the photo above. The -DPP option provides a burst of two positive output pulses on a common output with a variable time separation of 0 to ± 5 ns. (Other delay ranges can be provided upon request.) Two independent pulse width and amplitude controls are provided. Units with the -DPP option have a maximum output

amplitude of 70% of the standard maximum amplitude (except when the relative time delay is set to zero, in which case the addition of the two coincident pulses allows the 140% of the standard amplitude to be obtained). The -DPN option is similar, except that one pulse in the doublet is positive, and one is negative. These double-pulse options are not available on units with the dual-channel options. The -DPP / -DPN options increase the rise and fall times by 50 ps.

All models are available with a monitor output option that provides an attenuated (20 dB) coincident replica of the main output pulse. Avtech recommends that units with the double-pulse option also be ordered with the monitor option, to simplify pulse alignment.

A bias insertion option is available. Units with this option include a circuit similar to Model AVX-T at the output (for details see <http://www.avtechpulse.com/bias/avx-t>). The required offset or DC bias is applied directly to rear panel solder terminals. Another option provides an internally generated DC offset (0 to ± 5 Volts), which is adjustable using the front-panel controls. Additional options include analog electronic control (0 to +10V) of output amplitude, pulse width and DC offset. Units with these options also include the standard front-panel controls.

Instruments with the "-B" suffix include a complete 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, polarity, 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 the Avtech web site (<http://www.avtechpulse.com/labview>).

The -VXI option adds a rear-panel Ethernet connector, allowing the instrument to be remotely controlled using the VXI-11.3, ssh, telnet, and web protocols. In particular, the VXI-11.3 features allows software like LabView to control an instrument using standard VISA communications drivers and network cabling, instead of using older-style GPIB cabling and GPIB controller cards. See <http://www.avtechpulse.com/options/vxi> for details.

The -C versions provide output pulse parameters similar to those of the -B models, but do not include the GPIB or RS-232 interfaces (i.e. no computer control or LCD display). The output parameters are controlled by front-panel switches and one-turn controls. -B and -C model require 100-240V, 50-60 Hz power.

Most AVP units are available in a DC-powered (+15V) miniature module format. These modules require a TTL input trigger signal and the output PRF equals the input trigger PRF. Pulse width and output amplitude are controlled by one-turn controls.

For applications requiring fast but narrower pulses, the Avtech AVH-S-1 series (<http://www.avtechpulse.com/impulse/avh-s-1>) of impulse generators should also be considered.



SPECIFICATIONS

AVP SERIES

Model:	AVP-AV-1S-C ¹	AVP-2SA-C ¹	AVP-3SA-C ¹	AVP-AV-1-C ¹	AVP-AV-HV2-C ¹	AVP-AV-HV3-C ¹	AVP-AV-2-C ¹
	AVP-AV-1S	AVP-2SA	AVP-3SA	AVP-AV-1-B ²	AVP-AV-HV2-B ²	AVP-AV-HV3-B ²	AVP-AV-2-B ²
Maximum amplitude ^{3,4,8,18} : (50Ω load)	5 Volts	5 Volts	10 Volts	10 Volts	20 Volts	40 Volts ¹²	10 Volts
Pulse width ³ : (FWHM)	-C & Modules: 0.2 - 4 ns			0.2 - 4 ns	0.3 - 2 ns std. (0.3 - 4 ns opt ¹⁶)	0.4 - 2 ns std. (0.4 - 4 ns opt ¹⁵)	2 - 50 ns std. (20-500 ns opt ¹⁵)
PRF: external trigger mode: internal trigger (-B, -C):	0 Hz to 1 MHz 100 Hz to 1 MHz						0 Hz - 50 kHz 5 Hz - 50 kHz
Rise time (20%-80%) ^{7,8} :	≤ 60 ps	≤ 40 ps	≤ 50 ps	≤ 100 ps	≤ 100 ps	≤ 150 ps	≤ 100 ps
Fall time (80%-20%) ^{7,8} :	≤ 200 ps	≤ 250 ps	≤ 250 ps ¹³	≤ 300 ps	≤ 300 ps	≤ 300 ps ¹⁵	≤ 200 ps
Polarity:	-C units: specify -P, -N, -PN Modules: specify -P or -N			-C units: specify -P, -N, -P-PN, or -N-PN (see note 6) -B units: specify -P, -N, or -PN Modules: specify -P or -N			
Dual-Polarity Option Style: (not available on modules)	Two outputs (+ and -). Only one active at a time.			-C units: one output, with inverting transformer accessory. -B units: one output, with switchable polarity			
Required load impedance:	50 Ohms ¹⁴						
GPIB and RS-232 control ² :	Standard on -B units. Not available on -C units or modules.						
LabView Drivers:	-B units only: check http://www.avtechpulse.com/labview for availability and downloads						
Ethernet port, for remote control using VXI-11.3, ssh, telnet, & web:	Optional on -B units ⁹ . Recommended as a modern alternative to GPIB / RS-232. See http://www.avtechpulse.com/options/vxi for details.						
Settings resolution (-B units):	The resolution of the timing parameters (pulse width, delay, period) varies, but is always better than 0.15% of (set value + 20 ns). The amplitude resolution is < 0.1% of the maximum amplitude.						
Settings accuracy (-B units):	Typically ± 3% (±2 ns or ± 2% of max. amplitude) after 10 minute warmup, for pulse widths > 1 ns and PRF ≤ 10 kHz. At lower pulse widths and higher PRFs, the amplitude tends to roll off relative to the set value. For high-accuracy applications requiring traceable calibration, verify the output with a calibrated oscilloscope.						
Two channel option:	Optional ⁷ . Available on -B & -C models.						
Double pulse option:	Not available.			Optional ⁸ . Available on -B & -C models. 0 to ±5 ns pulse separation (other ranges available).			Not available.
Propagation delay: (Ext trig in to pulse out)	-C units and Modules: ≤ 70 ns ¹⁷ (Ext trig in to pulse out) -B units: ≤ 140 ns ¹⁷ (Ext trig in to pulse out)						< 250 ns
Jitter, Ext trig in to pulse out:	-C units and Modules: ±15 ps -B units: ± 35ps ± 0.015% of sync delay						
Trigger modes:	-B units:	Internal trigger, external trigger (TTL level pulse, > 10 ns, 1 kΩ input impedance), front-panel "Single Pulse" pushbutton, or single pulse trigger via computer command					
	-C units:	Internal trigger, or external trigger (TTL level pulse, > 50 ns, 1 kΩ input impedance)					
	Modules:	External trigger (TTL level pulse, > 50 ns, 1 kΩ input impedance)					
Variable delay:	-B units:	Sync to main out: 0 to 1.0 seconds, for all trigger modes (including external trigger).					
	-C units:	Sync to main out: 0 to 200 ns, for internal trigger mode only. No variable delay in external trigger mode					
	Modules:	No variable delay					
Sync output (-B, -C unit only):	+3 Volts, > 50 ns, will drive 50 Ohm loads						
DC offset or bias insertion:	Optional ¹⁰ . Apply required DC offset or bias in the range of ± 50V (250 mA max) to back panel solder terminal.						
Monitor output option ¹¹ :	Provides a 20 dB (x10) attenuated coincident replica of main output						
Connectors:		Modules		-C units		-B units	
	OUT, MONITOR:	SMA		SMA		SMA	
	TRIG:	SMA		BNC		BNC	
	SYNC:	-		BNC		BNC	
	GATE:	-		-		BNC	
	DC POWER:	solder terminals		-		-	
Optional accessory kit: (attenuators and terminators)	Add the suffix "-AK1" to the model number to include the recommended accessory kit. Consists of three SMA, 18 GHz, 2 Watt attenuators (10, 20 & 30 dB) for use on the output, and two 50 Ohm, 1 GHz, 1 Watt feed-through terminators (one SMA, one BNC) for use on external trigger inputs.						
Optional accessory kit: (coaxial cables and adapters)	Add the suffix "-AK8" to the model number to include the recommended accessory kit. Consists of one 12-inch SMA-M/SMA-M PE-SR405FL coaxial cable, one 12-inch SMA-M/SMA-M RG-316 coaxial cable, one 36-inch SMA-M/SMA-M RG-316 coaxial cable, one 24-inch SMA-M/BNC-M RG-316 coaxial cable, one 36-inch BNC-M/BNC-M RG58C/U coaxial cable, one SMA-F to BNC-M adapter, one SMA-M to BNC-F adapter, one SMA-F to SMA-F adapter, and one SMA-F to solder cup adapter						
Temperature range:	+5°C to +40°C						
Other:		Modules		-B & -C units			
	Power requirements:	+15 Volt, 200 mA		100 - 240 Volts, 50 - 60 Hz			
	Dimensions:	43 × 66 × 107 mm (1.7" × 2.6" × 4.2")		100 × 430 × 375 mm (3.9" × 17" × 14.8")			
	Chassis material:	cast aluminum, blue enamel		anodized aluminum, with blue plastic trim			

- C suffix indicates stand-alone lab instrument with internal clock and line powering. No suffix indicates miniature module requiring DC power and external trigger. (See <http://www.avtechpulse.com/formats> for details of the four basic instrument formats).
- B suffix indicates IEEE-488.2 GPIB and RS-232 control of amplitude, pulse width, PRF and delay (See <http://www.avtechpulse.com/gpib>).
- For analog electronic control (0 to +10V) of amplitude, pulse width or DC offset suffix model number with -EA or -EW or -EO. Electronic control units also include standard front-panel controls.
- For operation at amplitudes of less than 20% of full-scale, best results will be obtained by setting the amplitude near full-scale and using external attenuators on the output.
- For 20-500 ns pulse width, suffix model number with -W500. Rise times increase to 150 ps for -W500 units.
- Indicate desired polarity by suffixing model number by -P or -N (i.e. positive or negative) or -P-PN or -N-PN for dual-polarity option where the suffix preceding -PN indicates the polarity at the mainframe output port.
- For the two channel option, add the suffix -2CHPP for two positive outputs, the suffix -2CHNN for two negative outputs, or the suffix -2CHPN for the one positive output and one negative output.
- For the double pulse option add the suffix -DPP for a unipolar output, and add the suffix -DPN for a bipolar output. These options cause the maximum amplitude to be reduced by 30%, and increase the rise and fall times by 50 ps.
- Add the suffix -VX1 to the model number to specify the Ethernet port.
- For externally applied DC offset option suffix model number with -OS. The Avtech AVX-T bias tee can also be used to obtain DC offset. For internally generated DC offset option (0 to ±5V) add suffix -OT or -EO to model number. (The -OT option is controlled by a front-panel dial, whereas the -EO option can be controlled by a front-panel dial or by an external 0 to +10V voltage). -OT, -EO not available on modules.
- For monitor option add suffix -M.
- At maximum pulse width. The maximum amplitude may fall for narrower pulse widths, with reduction of < 25% at the minimum specified pulse width.
- Typically < 100 ps at minimum pulse width. Increases at wider pulse widths.
- A 50 Ohm load is required. Other loads may damage the instrument. Consult Avtech (info@avtechpulse.com) if you need to drive other load impedances.
- For 0.4 - 4 ns pulse width, suffix model number with -W4. Fall times increase to 450 ps for -W4 models.
- For 0.3 - 4 ns pulse width, suffix model number with -W5.
- Add 200 ns to propagation delay specification for units with the -DPP or -DPN double-pulse options.
- The amplitude on -C units is normally controlled by a one-turn dial. It may be replaced with a ten-turn dial by specifying the -AT option.



AVP-AV-1-B

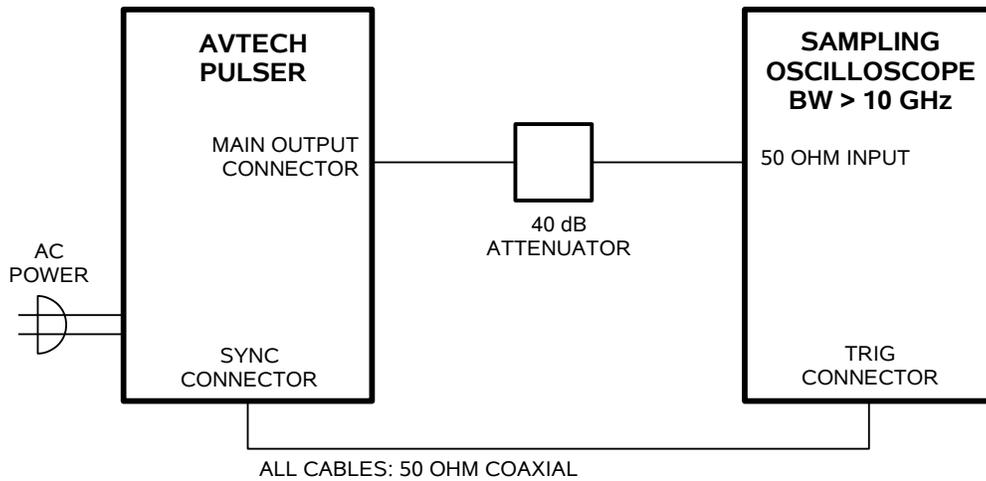


AVP-AV-1-C



AVP-AV-1

BASIC TEST ARRANGEMENT FOR -B AND -C UNITS



Avtech frequently customizes models to meet special requirements at near-stock prices!

Contact Avtech (info@avtechpulse.com) today with your special requirements!