INSTRUCTIONS

MODEL AVP-AV-1S

0 to 5V, 0.2 to 4 ns

PULSE GENERATOR MODULE

WITH 65 ps RISE TIME

SERIAL NUMBER: _____

WARRANTY

Avtech Electrosystems Ltd. warrants products of its manufacture to be free from defects in material and workmanship under conditions of normal use. If, within one year after delivery to the original owner, and after prepaid return by the original owner, this Avtech product is found to be defective, Avtech shall at its option repair or replace said defective item. This warranty does not apply to units which have been dissembled, modified or subjected to conditions exceeding the applicable specifications or ratings. This warranty is the extent of the obligation assumed by Avtech with respect to this product and no other warranty or guarantee is either expressed or implied.

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INTRODUCTION

The AVP-AV-1S is a high performance DC-powered module capable of generating up to 5V into 50Ω loads at repetition rates up to 1 MHz. The rise time is less than 65 ps, and the fall time is less than 200 ps. The pulse width is variable from 0.2 to 4 ns.

Instruments with the "-P" model suffix can generate 0 to +5V, whereas instruments with the "-N" model suffix can generate 0 to -5V.

The AVP-AV-1S must be triggered by an external TTL pulse (> 50 ns) applied to the "IN" connector.

The output is designed to drive 50Ω loads. (A 50Ω load is required for proper operation.) The output is AC-coupled.

This instrument is intended for use in research and development laboratories.

AVAILABLE OPTIONS

The AVP-AV-1S is available with several options:

-EA Option: the output amplitude can be controlled by an externally generated 0 to +10V analog control voltage.

-ECL Option: the input trigger levels are ECL, rather than TTL.

-EW Option: the output pulse width can be controlled by an externally generated 0 to +10V analog control voltage.
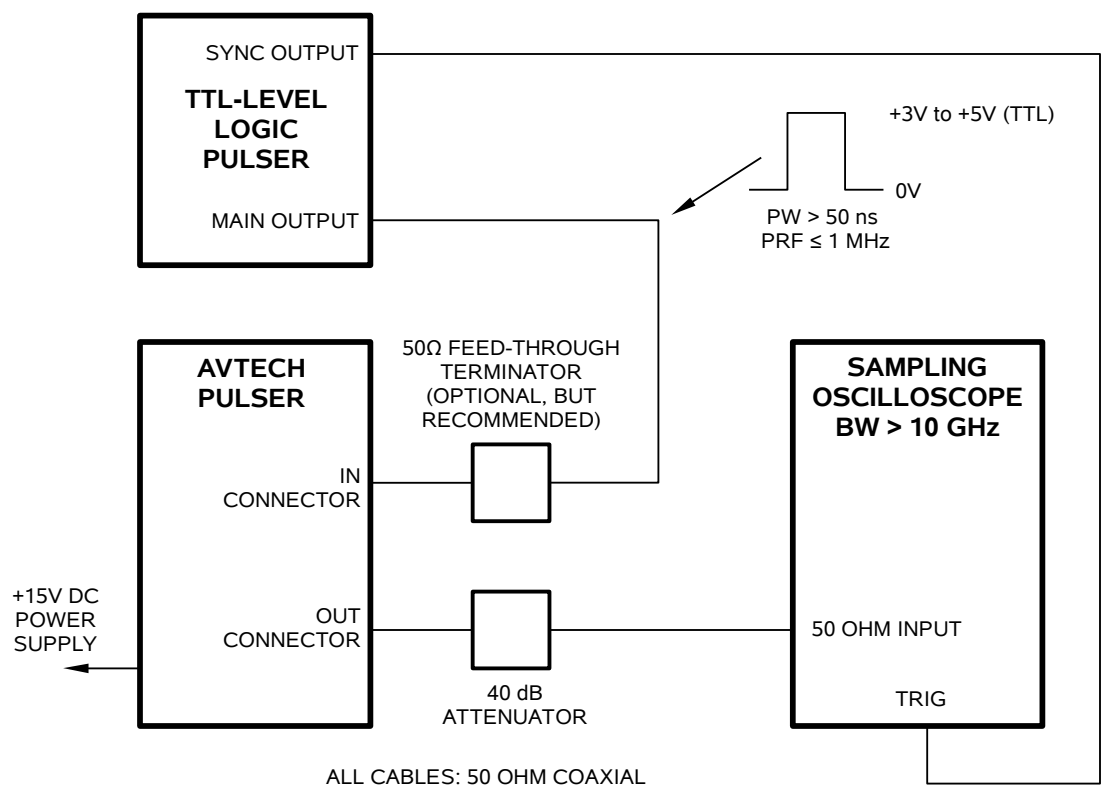
-M Option: a monitor output is provided.

-OS Option: an externally generated DC offset can be added to the output.

SPECIFICATIONS

Model:	AVP-AV-1S
Amplitude[3,4,8]: (50 Ohm load)	0 - 5 Volts
Pulse width[3]: (FWHM)	0.2 - 4 ns
PRF:	0 Hz to 1 MHz
Rise time (20%-80%)[7,8]:	≤ 65 ps
Fall time (80%-20%)[7,8]:	≤ 200 ps
Polarity:	specify -P or -N
Required load impedance:	50 Ohms[15]
Propagation delay:	≤ 70 ns (Ext trig in to pulse out)
Jitter, Ext trig in to pulse out:	±15 ps
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.
Trigger required:	+5 Volt, 50 ns to 500 ns (TTL). ECL trigger option available. See note 12.
Monitor output option[11]:	Provides a 20 dB (x10) attenuated coincident replica of main output
Connectors: OUT, MONITOR: TRIG: DC POWER:	SMA SMA solder terminals
Optional accessory kit:	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.
Power requirement:	+15 Volt, 200 mA
Dimensions (H x W x D):	43 mm x 66 mm x 107 mm (1.7" x 2.6" x 4.2")
Chassis material:	Cast aluminum, blue enamel
Mounting, Temperature range:	Any, +5°C to +40°C

1) -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).
2) -B suffix indicates IEEE-488.2 GPIB and RS-232 control of amplitude, pulse width, PRF and delay (See http://www.avtechpulse.com/gpib).
3) 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. -EW not available on -B units.
4) 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.
5) For 20-500 ns pulse width, suffix model number with -W. Rise times increase to 150 ps for -W units. -W units have a propagation delay of 30 ns.
6) 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.
7) 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.
8) 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.
9) Add the suffix -TNT to the model number to specify the Telnet / Ethernet control option.
10) 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.
11) For monitor option add suffix -M.
12) For ECL trigger option, add suffix -ECL.
13) For positive output only. Maximum amplitude for negative output is 35V.
14) Typically < 100 ps at minimum pulse width. Increases at wider pulse widths.
15) 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.

BASIC TEST ARRANGEMENT

TTL-LEVEL LOGIC PULSER

SYNC OUTPUT

MAIN OUTPUT

+3V to +5V (TTL)

0V

PW > 50 ns
PRF ≤ 1 MHz

AVTECH PULSER

IN CONNECTOR

OUT CONNECTOR

+15V DC POWER SUPPLY

50Ω FEED-THROUGH TERMINATOR (OPTIONAL, BUT RECOMMENDED)

40 dB ATTENUATOR

SAMPLING OSCILLOSCOPE BW > 10 GHz

50 OHM INPUT

TRIG

ALL CABLES: 50 OHM COAXIAL

CONTROLS – FRONT AND TOP

The location of the IN and OUT connectors, the optional "M" connector, and the amplitude and pulse width controls are shown in the photo below.

The "AMP" and "PW" controls may be adjusted using a screwdriver.

Units with the -EA option will have a solder terminal to control the amplitude, rather than a screwdriver-adjustable trimpot. The amplitude is then controlled by a 0 to +10V DC voltage applied to the solder terminal.

Units with the -EW option will have a solder terminal to control the pulse width, rather than a screwdriver-adjustable trimpot. The pulse width is then controlled by a 0 to +10V DC voltage applied to the solder terminal.

The -EA and -EW solder terminals are shown in the photo below:

CONTROLS - REAR

The location of the power terminals are shown in the photo below.

The +15V input terminal is protected with a 1N4746A Zener diode, which will fail as a short if an excessive positive voltage (> 18V), or a negative voltage, is applied to the terminal.

GENERAL OPERATING NOTES

1) The bandwidth capability of components and instruments used to display the pulse generator output signal (attenuators, cables, connectors, etc.) should exceed 10 GHz.

2) The use of 40 dB attenuator on the output will ensure a peak input signal to the sampling scope of less than one volt.

3) In general, the source pulse generator trigger delay control should be set in the 0.1 to 1.0 us range, for proper positioning of the output pulse on the sampling oscilloscope display.

4) WARNING: The module may fail if triggered at a PRF greater than 1 MHz.

5) The output pulse width is controlled by means of the one turn potentiometer (PW). The pot should initially be set maximum clockwise and the pulse width adjusted using an oscilloscope.

6) The output pulse amplitude is controlled by means of the one turn potentiometer (AMP). The pulse width may change by several nanoseconds as the output amplitude is reduced from maximum to minimum. Therefore it is convenient to first set the desired amplitude and then set the desired pulse width. Rotation of the PW pot causes the position of the falling edge of the pulse to change.

7) Some properties of the output pulse may change as a function of the amplitude pot setting. For some demanding applications, it may be desirable to use a combination of external attenuators and the amplitude pot to achieve the desired output amplitude.

8) To DC offset the output pulse connect a DC power supply set to required DC offset value to the terminals marked "OS". The maximum attainable DC offset voltage is +50 volts. (Option).

9) The monitor output port (M) provides a coincident attenuated (÷11) replica of the main output to a 50 ohm load. (Option).

PERFORMANCE CHECK SHEET