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## INSTRUCTIONS

MODEL AVM-1

0 TO 5 VOLTS, 25 MHz

HIGH SPEED PULSE GENERATOR MODULE

WITH 100 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 disassembled, 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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Manual Reference: T:\instructword\avm\AVM-1,edition\_d.sxw.

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## INTRODUCTION

The AVM-1 is a high performance DC-powered module capable of generating up to 5V into 50 $\Omega$  loads at repetition rates up to 25 MHz. The output pulse width is variable from 0.2 to 6 ns. The rise time is less than 100 ps, and the fall time is less than 135 ps.

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

The AVM-1 must be triggered by an external TTL pulse (> 10 ns) applied to the "IN" connector.

The output is designed to drive 50 $\Omega$  loads. (A 50 $\Omega$  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 AVM-1 is available with several options:

-D Option: this option adds a 0-5 ns adjustable delay feature, which operates in both the internal and external trigger modes.

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

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

-ED Option: the 0-5 ns delay can be controlled by an externally generated 0 to +10V analog control voltage. Units with the -ED option incorporate the -D option as well.

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

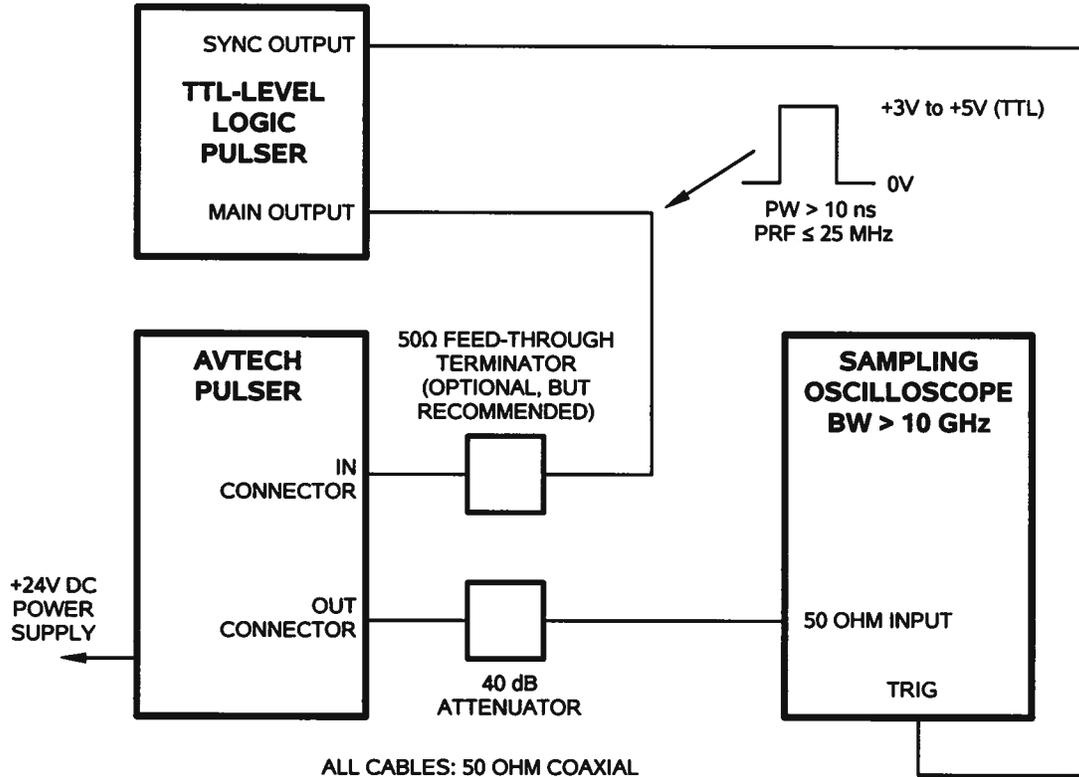
-M Option: a monitor output is provided.

## SPECIFICATIONS

Model:	AVM-1
Amplitude <sup>1,2</sup> : (into 50 Ohm load)	Variable to 5 Volts
Pulse width (FWHM) <sup>1</sup> :	Variable 0.2 to 6 ns
PRF:	0 to 25 MHz
Rise time (20% - 80%):	≤ 100 ps
Fall time (80% - 20%):	≤ 135 ps (typically 100 ps)
Polarity <sup>3</sup> :	Positive or negative (specify)
Propagation delay:	≤ 30 ns (Ext trig in to pulse out)
Variable propagation delay option <sup>1,4</sup> :	0 to 5 ns
Jitter:	± 15 ps (Ext trig in to pulse out)
Trigger required:	+5 Volts, 10 ns or wider (TTL)
DC offset or bias insertion:	Apply required DC offset to back panel solder terminals (± 50 Volts, 250 mA max)
Monitor output option <sup>5</sup> :	Provides a 20 dB attenuated coincident replica of main output
Connectors:	In, Out: SMA, Power: Solder terminals
Dimensions (H x W x D):	43 x 66 x 107 mm (1.7" x 2.6" x 4.2")
Power requirement:	+24V DC
Chassis material:	Cast aluminum, blue enamel
Temperature range:	+5°C to +40°C

- 1) For electronic control (0 to +10V) of amplitude, pulse width, or delay, suffix model number with -EA or -EW or -ED. Electronic control units also include the standard front panel one-turn controls.
- 2) 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.
- 3) Indicate desired polarity by suffixing model number with -P or -N.
- 4) Indicate delay option by suffixing model number with -D.
- 5) For monitor option add suffix -M.

## BASIC TEST ARRANGEMENT



## CONTROLS - FRONT

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. Instruments with the -EA and -EW options will have solder terminal inputs to control the amplitude and pulse width, respectively, instead of screwdriver-adjustable controls. This is shown in the photo below:



### CONTROLS - REAR

The location of the power terminals, the “12/25” switch, offset input are shown in the photo below.



The “12/25” switch should be set in the “12” position if the PRF is less than 12 MHz. For higher PRF the switch should normally be in the “25” position for optimal rise times and pulse widths.

## 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 insure 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  $\mu$ s range, for proper positioning of the output pulse on the sampling oscilloscope display.
- 4) When testing using a general purpose 50 ohm laboratory pulse generator as the input trigger signal source, the input signal should be applied via a 50 ohm feed-through terminator, or alternatively the input to the AVM unit should be shunted with a 50 ohm resistor. This will prevent reflection (and degradation of the input pulse waveform) caused by the high impedance at the IN port. When triggering from a TTL source, no 50 ohm feed-through load or resistor is necessary but lead length should be as short as possible. High-speed TTL Schottky logic is recommended for the driving circuitry.
- 5) The "12/25" switch should be set in the "12" position if the PRF is less than 12 MHz. For higher PRF the switch should normally be in the "25" position for optimal rise times and pulse widths.
- 6) The input trigger pulse width should be greater than 10 ns and less than one half of the pulse repetition frequency period. The unit triggers on the leading edge of the input trigger signal.
- 7) 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.
- 8) 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.
- 9) 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.
- 10) The AVM output pulse position or delay can be varied for up to 5 ns by means of the delay (DELAY) control. Rotating the delay control clockwise increases the delay. If the full 5 ns delay cannot be achieved then the input pulse width should be

increased by a few nanoseconds. (Option)

- 11) It is recommended that the module be bolted to a heatsink, for cooling purposes. This will improve the stability of the output, by reducing thermal drift.
- 12) **WARNING:** The module may fail if triggered at a PRF greater than 25 MHz.
- 13) 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).
- 14) The monitor output port (M) provides a coincident attenuated ( $\div 10$ ) replica of the main output to a 50 ohm load. (Option).
- 15) For additional information:

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