AVTECH ELECTROSYSTEMS LTD.

NANOSECOND WAVEFORM ELECTRONICS
SINCE 1975

P.O. BOX 265
OGDENSBURG, NY
U.S.A. 13669-0265

TEL: 888-670-8729 (USA & Canada) or +1-613-686-6675 (Intl)
FAX: 800-561-1970 (USA & Canada) or +1-613-686-6679 (Intl)

info@avtechpulse.com - http://www.avtechpulse.com/

BOX 5120, LCD MERIVALE
OTTAWA, ONTARIO
CANADA K2C 3H5

INSTRUCTIONS

MODEL AVM-3

15 VOLT, 25 MHz

HIGH SPEED PULSE GENERATOR MODULE

WITH 150 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.

TECHNICAL SUPPORT

Phone: 888-670-8729 (USA & Canada) or +1-613-686-6675 (International)
Fax: 800-561-1970 (USA & Canada) or +1-613-686-6679 (International)

E-mail: info@avtechpulse.com
World Wide Web: http://www.avtechpulse.com

TABLE OF CONTENTS

Manual Reference: /fileserver1/officefiles/instructword/avm/AVM-3,edition1.odt.
Last modified February 29, 2024.

INTRODUCTION

The AVM-3 is a high performance DC-powered module capable of generating up to 15V into 50Ω loads at repetition rates up to 25 MHz. The output pulse width is variable from 2 to 15 ns. The rise time is less than 150 ps, and the fall time is less than 800 ps.

Instruments with the "-P" model suffix can generate up to +15V, whereas instruments with the "-N" model suffix can generate up to -15V.

The AVM-3 must be triggered by an external TTL pulse (> 10 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 AVM-3 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.

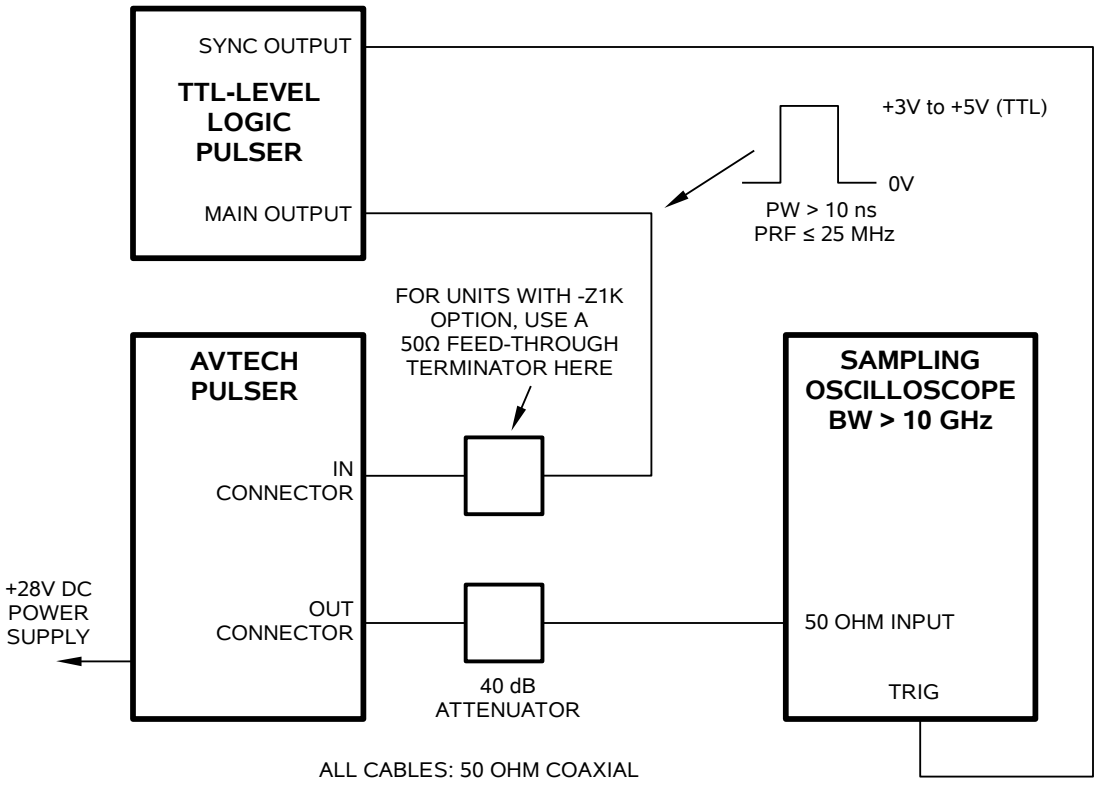
-M Option: a monitor output is provided.

SPECIFICATIONS

Model:	AVM-3
Maximum amplitude (into 50Ω)[1,2,8]:	15V
Pulse width (FWHM)[1]:	2.0 - 15 ns
Maximum PRF:	25 MHz
Rise time (20% - 80%):	≤ 150 ps
Fall time (80% - 20%):	≤ 800 ps
Required load[7]:	50 Ohms
Polarity[3]:	specify -P, -N, -P-PN, or -N-PN
Fixed propagation delay:	≤ 30 ns (Ext trig in to pulse out)
Variable delay, external trigger mode:	Optional[1,4], 0 to 5 ns
Jitter (EXT TRIG in to pulse out):	±15 ps
DC offset or bias insertion[1]:	Apply required DC offset to back panel solder terminals (± 50 Volts, 250 mA max)
External trigger	TTL-level (Low: 0V, High: +3V to +5V), 10 ns or wider.
Trigger input impedance:	50Ω (optionally 1 kΩ[7])
Monitor output option[5]:	Provides a 20 dB attenuated coincident replica of main output
Connectors (modules):	In, Out: SMA, 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 50Ω, 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-MRG-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
Dimensions (H x W x D):	43 x 66 x 107 mm (1.7” x 2.6” x 4.2”)
Power requirement:	+28V DC
Temperature range:	+5°C to +40°C

1) For analog electronic control (0 to +10V) of amplitude, pulse width, delay or offset suffix model number with -EA or -EW or -ED or -EO. Electronic control units also include the standard front panel one-turn controls. Not available on -B units (since remote control is already provided digitally).
2) For -C units and modules, the minimum useful amplitude is 20% of the maximum. For -B units, it is 4% of the maximum, due to the use of internally-switched attenuators. For operation at lower amplitudes, 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 (i.e. positive or negative), or -P-PN or -N-PN for dual polarity option on -C units and modules (where the suffix preceding -PN indicates the polarity at the mainframe output port), or -PN for the dual-polarity option on -B units.
4) Indicate delay option by suffixing model number with -D.
5) For monitor option add suffix -M.
6) 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.
7) An input impedance of ≥1 kΩ can also be provided (-Z1K option).
8) The maximum output amplitude may decline by up to 20% when operating at PRFs higher than 20% of the maximum specified PRF.

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.

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.

Units with the -D option will have an additional screwdriver-adjustable trimpot, which controls the 0 to 5 ns delay feature. Units with the -ED option will have a solder terminal to control the 0 to 5 ns delay, rather than a screwdriver-adjustable trimpot. The 0 to 5 ns delay is then controlled by a 0 to +10V DC voltage applied to the solder terminal.

CONTROLS - REAR

The location of the power terminals, the PRF switch, and the offset input are shown in the photo below.

A Zener diode is installed across the +28V and ground terminals, to protect the pulser from excessive or reverse voltages.

The PRF switch should be set in the “< 12” position if the PRF is less than 12 MHz. For higher PRFs the switch should normally be in the “> 12” position for optimal rise times and pulse widths, except when operating at very low 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) The input impedance of the TRIG connector is normally 50 Ohms, unless the -Z1K option has been ordered (in which case the input impedance is 1 kilohm). If the -Z1K option has been ordered, best results will be obtained by installing a 50 Ohm feed-through terminator on the TRIG input, to avoid transmission line reflections and false triggering.

4) The PRF switch should be set in the "< 12" position if the PRF is less than 12 MHz. For higher PRFs the switch should normally be in the "> 12" position for optimal rise times and pulse widths, except when operating at very low pulse widths.

5) 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.

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

7) 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 potentiometer causes the position of the falling edge of the pulse to change.

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

9) 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)

10) 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.

11) WARNING: The module may fail if triggered at a PRF greater than 25 MHz.

12) To DC offset the output pulse connect a DC power supply set to required DC offset value to the terminals marked “OS”. (Option).

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

PERFORMANCE CHECK SHEET