



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 3H4

## INSTRUCTIONS

MODEL AVM-1-P-ESIA

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.

### 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](mailto:info@avtechpulse.com)

World Wide Web: <http://www.avtechpulse.com>

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Manual Reference: /fileserver1/officefiles/instructword/avm/AVM-1-P-ESIA,ed1.odt.  
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## INTRODUCTION

The AVM-1-P-ESIA 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 < 150 ps to 2 ns. The rise time is less than 100 ps, and the fall time is less than 250 ps.

The AVM-1-P-ESIA 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, development, test and calibration laboratories by qualified personnel.

## SPECIFICATIONS

Model:	AVM-1-P-ESIA
Amplitude <sup>1</sup> : (into 50 Ohm load)	Variable to +5 Volts
Pulse width (FWHM):	Variable 0.15 to 2 ns
PRF:	0 to 25 MHz
Rise time (20% - 80%):	≤ 100 ps
Fall time (80% - 20%):	≤ 250 ps
Polarity <sup>3</sup> :	Positive
Propagation delay:	≤ 30 ns (Ext trig in to pulse out)
Jitter:	± 15 ps (Ext trig in to pulse out)
Trigger required:	+5 Volts, 10 ns or wider (TTL)
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 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.

ORIGINAL QUOTATION

Date: Thu, 16 Oct 2008 15:45:30 -0400  
 From: Avtech Sales  
 To: xxxxx  
 Subject: Avtech pulse generator quote

xxxxx,

Following your recent inquiry, I am pleased to quote as follows:

Quote number: 14516

Model number: AVM-1-P-ESIA

Description: Customized Ultra High Speed Pulse Generator

Polarity: positive

-ESIA special option: The pulse width is adjustable from 0.15 to 2.0 ns (FWHM), rather than the standard range of 0.25 to 6 ns.

Other: as per the standard AVM-1-P, described at  
<http://www.avtechpulse.com/speed/avm-1>

PDF datasheet: [http://www.avtechpulse.com/catalog/page018\\_cat11\\_avm\\_rev7.pdf](http://www.avtechpulse.com/catalog/page018_cat11_avm_rev7.pdf)

Price: \$xxxxx US each, DDU (Delivered Duty Unpaid). Includes the cost of shipping and insurance, but excludes customs duties, taxes, and other import fees. Shipments are from Canada, and are normally duty-free.

Quote valid for: 8 weeks

Estimated delivery: 10-12 weeks after receipt of order.

The AVM-1-P-ESIA requires a 50 Ohm load for proper operation.

Please call or email me if I can be of further assistance.

Thank you for your interest in our products!

Regards,

Dr. Michael J. Chudobiak  
 Chief Engineer

--- Avtech Electrosystems Ltd. ----- since 1975 ---

PO Box 265	ph: 888-670-8729 or 613-686-6675	Box 5120
Ogdensburg	fax: 800-561-1970 or 613-226-2802	LCD Merivale
New York		Ottawa, Ontario
USA 13669-0265	<a href="mailto:info@avtechpulse.com">info@avtechpulse.com</a>	Canada K2C 3H4
	<a href="http://www.avtechpulse.com">www.avtechpulse.com</a>	

Pulse Generators - Laser Diode Drivers - HV Amplifiers  
 Monocycle Generators - Impulse Generators - Pulse Amplifiers  
 Function Generators - Frequency Dividers - Standard & Customized

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## EUROPEAN REGULATORY NOTES

### EC DECLARATION OF CONFORMITY

We Avtech Electrosystems Ltd.  
P.O. Box 5120, LCD Merivale  
Ottawa, Ontario  
Canada K2C 3H4

declare that this pulse generator meets the intent of Directive 89/336/EEC for Electromagnetic Compatibility. Compliance pertains to the following specifications as listed in the official Journal of the European Communities:

EN 50081-1 Emission

EN 50082-1 Immunity

and that this pulse generator meets the intent of the Low Voltage Directive 72/23/EEC as amended by 93/68/EEC. Compliance pertains to the following specifications as listed in the official Journal of the European Communities:

EN 61010-1:2001 Safety requirements for electrical equipment for measurement, control, and laboratory use



### DIRECTIVE 2002/95/EC (RoHS)

This instrument is exempt from Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the Restriction of the use of certain Hazardous Substances (RoHS) in electrical and electronic equipment. Specifically, Avtech instruments are considered "Monitoring and control instruments" (Category 9) as defined in Annex 1A of Directive 2002/96/EC. The Directive 2002/95/EC only applies to Directive 2002/96/EC categories 1-7 and 10, as stated in the "Article 2 - Scope" section of Directive 2002/95/EC.

### DIRECTIVE 2002/96/EC (WEEE)

European customers who have purchased this equipment directly from Avtech will have completed a "WEEE Responsibility Agreement" form, accepting responsibility for WEEE

compliance (as mandated in Directive 2002/96/EC of the European Union and local laws) on behalf of the customer, as provided for under Article 9 of Directive 2002/96/EC.

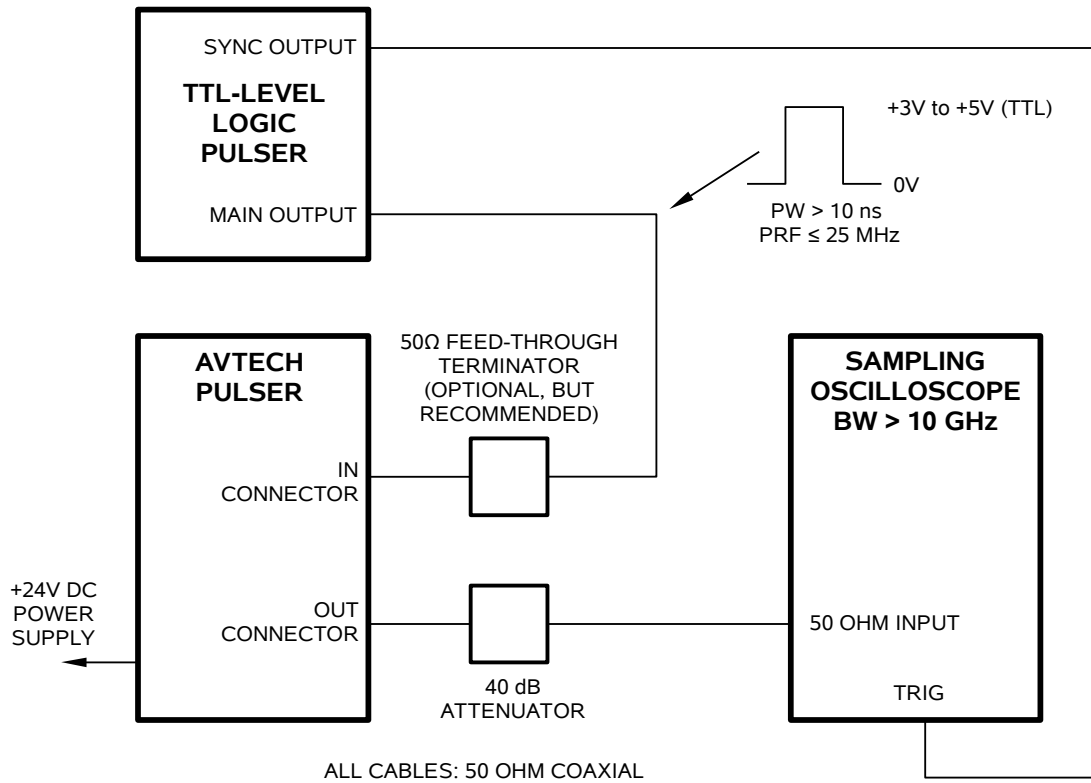
Customers who have purchased Avtech equipment through local representatives should consult with the representative to determine who has responsibility for WEEE compliance. Normally, such responsibilities will lie with the representative, unless other arrangements (under Article 9) have been made.

Requirements for WEEE compliance may include registration of products with local governments, reporting of recycling activities to local governments, and financing of recycling activities.





## 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.

### 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 us 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) 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.

PERFORMANCE CHECK SHEET