



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 AVMP-2-EA-EW-P-NTD

0 to +5V, 5 to 105 ns

PULSE GENERATOR

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>

TABLE OF CONTENTS

**WARRANTY.....2**

**TECHNICAL SUPPORT.....2**

**TABLE OF CONTENTS.....3**

**INTRODUCTION.....4**

**ORIGINAL QUOTATION AND SPECIFICATIONS.....5**

**REGULATORY NOTES.....7**

    FCC PART 18.....7

    EC DECLARATION OF CONFORMITY.....7

    DIRECTIVE 2002/95/EC (RoHS).....8

    DIRECTIVE 2002/96/EC (WEEE).....8

**BASIC TEST ARRANGEMENT.....9**

    CONTROLS - FRONT.....9

    CONTROLS - REAR.....10

    GENERAL OPERATING NOTES.....11

**PERFORMANCE CHECK SHEET.....12**

Manual Reference: /filesserver1/officefiles/instructword/avmp/AVMP-2-EA-EW-P-NTD,ed1.odt.  
Last modified February 29, 2024.  
Copyright © 2024 Avtech Electrosystems Ltd, All Rights Reserved.

## INTRODUCTION

The AVMP-2-EA-EW-P-NTD is a high performance DC-powered module capable of generating up to +5V into 50 $\Omega$  loads at repetition rates up to 10 kHz. The rise time is less than 100 ps, and the fall time is less than 150 ps. The pulse width is variable from 5 to 105 ns.

The AVMP-2-EA-EW-P-NTD amplitude is controlled by a DC control voltage in the range of 0 to +10V applied to a solder terminal. Zero input corresponds to zero output, and +10V corresponds to maximum output amplitude (10V).

The AVMP-2-EA-EW-P-NTD pulse width is controlled by a DC control voltage in the range of 0 to +10V applied to a solder terminal. Zero input corresponds to < 5 ns pulse width, and +10V corresponds to maximum pulse width (> 105 ns).

The amplitude and pulse width controls may interact with each other and may also show a frequency dependence. Settings should be confirmed by measurement.

The AVMP-2-EA-EW-P-NTD is designed to be triggered by a TTL-level pulse, with width > 100 ns, applied to the "IN" connector. The input impedance is 50 Ohms.

A sync output is also provided, for triggering other equipment, such as oscilloscopes. It is a TTL-level pulse, with a pulse width of 1.5  $\mu$ s.

The propagation delay from TRIG IN to SYNC OUT is < 100 ns (fixed).

The propagation delay from SYNC OUT to MAIN OUT is 520 ns, +/- 20 ns (fixed).

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.

## ORIGINAL QUOTATION AND SPECIFICATIONS

Date: Mon, 19 Sep 2011 09:42:13 -0400  
From: Avtech Sales  
To: XXXXX  
Subject: Re: Interested in pulser to drive intensity modulator

XXXXX,

We have received your purchase order XXXXX. Thank you for your order!

However, we will require a revised purchase order with a new model number, because you have changed the specifications in the text.

Also, there is a conflict in your specifications regarding the delay times. The TRIG-to-MAIN delay should be the sum of the TRIG-to-SYNC and SYNC-to-MAIN delays, but it isn't in your specifications.

I have re-quoted below on a revised model with non-adjustable delays, revised PW and SYNC pulse width specs, a new model number, and a reduced price.

For simplicity, all delays are non-adjustable in this version.

Please confirm whether or not this meets your needs, and if so, please send us a revised purchase order.

If this does not meet your requirements, please email a sketch of the required TRIG-to-SYNC, SYNC-to-MAIN, and TRIG-to-MAIN timing.

Quote number: 15822

Model number: AVMP-2-P-EA-EW-NTD

PRF: 1 Hz to 10 kHz, controlled by input trigger PRF.

Rise time (20%-80%): < 100 ps

Fall time (80%-20%): < 150 ps

Pulse width (FWHM): 5 to 105 ns, controlled by an externally applied 0 to +10 VDC control voltage.

Pulse amplitude: up to +5 Volts, controlled by an externally applied 0 to +10 VDC control voltage.

Required load: 50 Ohms

Ext trigger signal: TTL, PW > 100 ns, SMA female connector, 50 Ohm input impedance.

Output connectors: SMA female

Sync out: TTL, PW = 1500 ns (+/- 10%), will drive 50 Ohms

Propagation delay, TRIG IN to SYNC OUT: < 100 ns (fixed)

Propagation delay, SYNC OUT to MAIN OUT: 520 ns, +/- 20 ns (fixed)

Propagation delay, TRIG IN to MAIN OUT: The total delay is the sum of the two previous delays = (< 100 ns) + (520 ns, +/- 20 ns).

Jitter: < ± 35 ps

Polarity: Positive

DC Offset: 0 to  $\pm$  5 Volts (externally generated)

DC Power: +24 VDC, 300 mA.

Module dimensions: 43 mm x 76 mm x 152 mm

DC connectors: Solder terminal.

Price (Qty 1): \$XXXXX US each, DAP (Delivered At Place). Includes the cost of shipping and insurance, but excludes customs duties, taxes, and other import fees. Shipments are from Canada, via FedEx, and are normally duty-free.

Quote valid for: 8 weeks.

Terms: Net 30 days.

Note: Orders with Avtech are non-cancelable, non-refundable. Avtech does not offer returns, due to the highly-specialized low-volume nature of our instruments.

Estimated delivery: 7 weeks after receipt of order.

End Use Statement: An "End Use Statement - Low Speed Models" form must be completed when ordering, to determine if any special export control regulations apply. We can not process your order without this information. The necessary form is attached (in PDF format), and is also available at:

<http://www.avtechpulse.com/end-use/EndUseStatement,LowSpeed,v8.pdf>

We sent you the wrong End Use Statement form in earlier quotes. Please use the "Low Speed" version attached to this email.

Thank you for your continued 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 613-686-6679	LCD Merivale
New York		Ottawa, Ontario
USA 13669-0265	info@avtechpulse.com	Canada K2C 3H4
	www.avtechpulse.com	

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

-----

## REGULATORY NOTES

### FCC PART 18

This device complies with part 18 of the FCC rules for non-consumer industrial, scientific and medical (ISM) equipment.

This instrument is enclosed in a rugged metal chassis and uses a filtered power entry module (where applicable). The main output signal is provided on a shielded connector that is intended to be used with shielded coaxial cabling and a shielded load. Under these conditions, the interference potential of this instrument is low.

If interference is observed, check that appropriate well-shielded cabling is used on the output connectors. Contact Avtech ([info@avtechpulse.com](mailto:info@avtechpulse.com)) for advice if you are unsure of the most appropriate cabling. Also, check that your load is adequately shielded. It may be necessary to enclose the load in a metal enclosure.

If any of the connectors on the instrument are unused, they should be covered with shielded metal "dust caps" to reduce the interference potential.

This instrument does not normally require regular maintenance to minimize interference potential. However, if loose hardware or connectors are noted, they should be tightened. Contact Avtech ([info@avtechpulse.com](mailto:info@avtechpulse.com)) if you require assistance.

### 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 2004/108/EG 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)

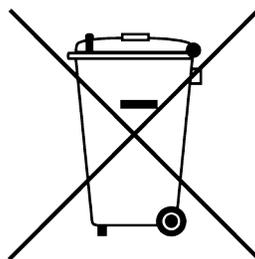
This instrument is exempt from Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the Restriction of the use of certain Hazardous Substances (RoHS) in electrical and electronic equipment. Specifically, Avtech instruments are considered "Monitoring and control instruments" (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)

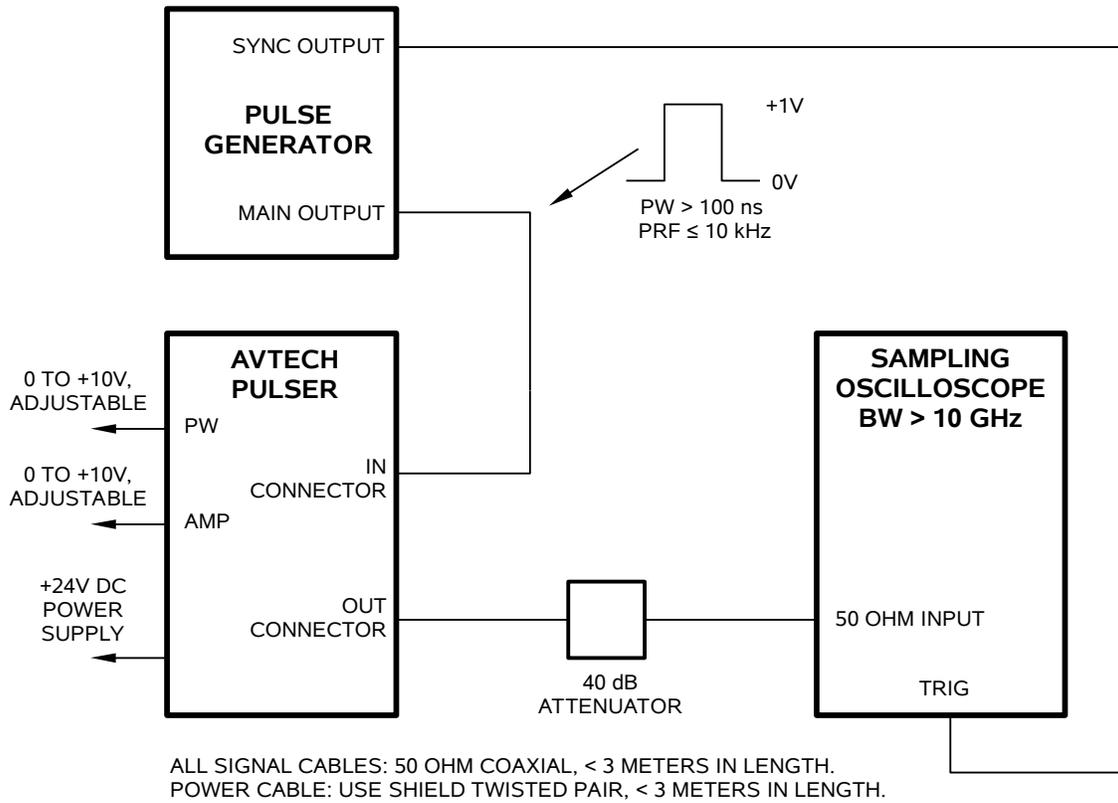
European customers who have purchased this equipment directly from Avtech will have completed a "WEEE Responsibility Agreement" form, accepting responsibility for WEEE compliance (as mandated in Directive 2002/96/EC of the European Union and local laws) on behalf of the customer, as provided for under 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.

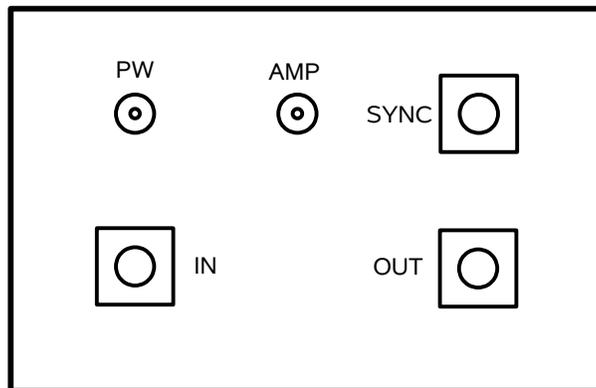


BASIC TEST ARRANGEMENT



CONTROLS - FRONT

The location of the IN, OUT, and SYNC connectors and the amplitude and pulse width controls are shown in the photo below:



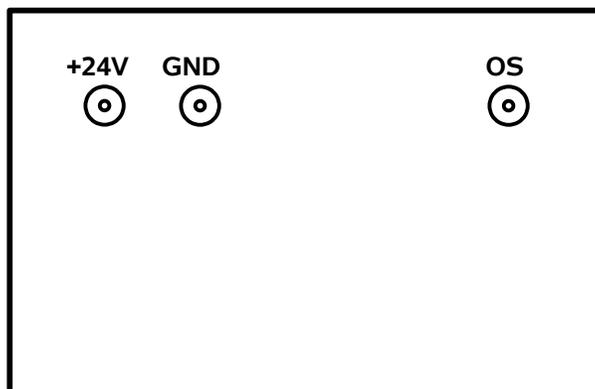
The function of each item is described below:

- AMP. The amplitude is controlled by a DC control voltage in the range of 0 to +10V applied to the “AMP” solder terminal. Zero input corresponds to zero output, and +10V corresponds to maximum output amplitude (5V).
- PW. The pulse width is controlled by a DC control voltage in the range of 0 to +10V applied to the “PW” solder terminal. Zero input corresponds to < 5 ns pulse width, and +10V corresponds to maximum pulse width (> 105 ns).
- IN. The AVMP-2-EA-EW-P-NTD is designed to be triggered by a TTL pulse, with width > 100 ns, applied to this connector. Do not exceed 10 kHz. The input impedance of this connector is 50 Ohms. For each input pulse, one output pulse will be generated.
- SYNC. This connector provides a 1.5us-wide TTL-level SYNC OUT pulse to loads of 50 Ohms or higher. The SYNC OUT pulse precedes main output by approximately 520 ns.
- OUT. This is the main output. It must be terminated with 50 Ohms.

#### CONTROLS - REAR

The +24V DC power input and the ground terminal are located on the rear of the module.

An “OS” offset input solder terminal is present on the rear panel as well.



The +24V input terminal is protected with a 1N4750A Zener diode, which will fail as a short if an excessive positive voltage (> 27V), 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 1 Volt.
- 3) WARNING: The module may fail if triggered at a PRF greater than 10 kHz.
- 4) The amplitude, pulse width, and PRF parameters may interact to some extent. 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 control voltage to achieve the desired output amplitude.

PERFORMANCE CHECK SHEET