



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 AVX-S1-TO66-NP1A

PLUG-IN SOCKET

OUTPUT MODULE

FOR TO66 PACKAGES

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

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

TABLE OF CONTENTS

WARRANTY.....	2
TECHNICAL SUPPORT.....	2
TABLE OF CONTENTS.....	3
INTRODUCTION.....	4
SPECIFICATIONS.....	5
REGULATORY NOTES.....	6
FCC PART 18.....	6
EC DECLARATION OF CONFORMITY.....	6
DIRECTIVE 2011/65/EU (RoHS).....	7
DIRECTIVE 2002/96/EC (WEEE).....	7
GENERAL INFORMATION.....	9
BASIC TEST ARRANGEMENT.....	9
AMPLITUDE CONTROL.....	11
MECHANICAL DIMENSIONS.....	12
PERFORMANCE CHECKSHEET.....	13

Manual Reference: /fileserver1/officefiles/instructword/avx-s/AVX-S1-TO66-NP1A,ed1.odt.

Last modified February 29, 2024.

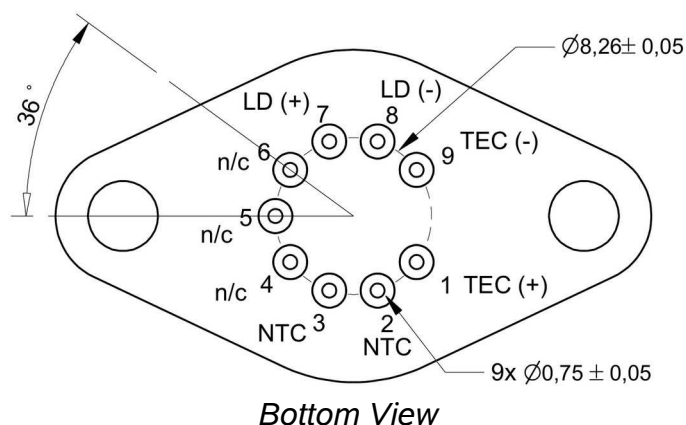
Copyright © 2024 Avtech Electrosystems Ltd, All Rights Reserved.

INTRODUCTION

The AVX-S series of bias insertion units is designed to combine a pulse signal with a DC bias, and supply the resulting signal to a laser diode, which is inserted into a high quality socket included on the mount. The bias insertion module includes the necessary networks to match the laser diode to the pulse source, as well as networks for applying DC bias to the diode.

The AVX-S1-TO66-NP1A is specifically designed for use as a replacement output module for Avtech AVO-9B2-B-P laser diode drivers.

The AVX-S1-TO66-NP1A output module is designed to accommodate a 9-pin nanoplus TO66 package with 0.75mm pins on a 8.26mm pin circle diameter, spaced 36 degrees apart, with the pinout shown below:



The LD(-) pin (the cathode) is grounded. The positive signal is applied to the LD(+) pin (the anode).

A male DB-9 connector is provided on the output module, which provides access to the thermal control pins of the diode. DB-9 pin 2 connects to diode pin 2 (thermistor). DB-9 pin 3 connects to diode pin 3 (thermistor). DB-9 pin 4 connects to diode pin 1 (TEC+). DB-9 pin 5 connects to diode pin 9 (TEC-). The remaining DB-9 pins are unconnected.

Model AVX-S1-TO66-NP1A-RS33 has a resistance of 33 Ohms (0.5W) in series with the DUT. The diode should have a parasitic resistance (dV/dI at lasing) of ~17 Ohms for proper impedance matching.

Model AVX-S1-TO66-NP1A-RS45 has a resistance of 45 Ohms (0.5W) in series with the DUT. The diode should have a parasitic resistance (dV/dI at lasing) of ~5 Ohms for proper impedance matching.

The total impedance should be ~ 50 Ohms.

SPECIFICATIONS

Model:	AVX-S1-TO66-NP1A
Peak diode current (I_{PEAK}):	400 mA
Max. input amplitude:	20 Volts
Pulse width (PW):	0.4 ¹ - 200 ns
Rise time (20%-80%):	0.2 ns ¹
Pulse repetition freq. (PRF) ⁸ :	DC - 25 MHz
N (transformer ratio ^{2,3}):	+1
R_S ^{9,10} :	-RS33 units: 33 Ω , ½ W -RS45 units: 45 Ω , ½ W
Max. DC bias current:	100 mA
R_{DC} (in series with DC input) ¹¹ :	50 Ω , ½ W
Max. DC bias voltage:	50 Volts
IN connector:	1 SMA
Included cables ⁷ :	1
Other connectors:	MV, MI, MD: SMA (female), DC bias: solder terminal
Diode socket:	See manual text
Dimensions:	H x W x D: 56 x 120 x 70 mm
Material:	Aluminum

- 1) Lower pulse widths (to 0.2 ns) and faster rise times (0.1 ns) may be possible for laser diode packages with very low parasitic inductance. The -P0 and -P2 packages generally have very low inductance. The -P1, -P3, and -TO3 packages normally have somewhat higher parasitic inductance.
- 2) The transformer reduces the input voltage by a factor of N (approx) and increases the current by a factor of N (approx). The load resistance ($R_S + R_{DIODE}$) must equal $50\Omega / N^2$ (approx).
- 3) A polarity inverting option is available. Add the suffix -INV to the model number to specify this option. "N" is negative ($\approx -70\%$ of the standard value) when this option is installed.
- 4) Generic option. A drawing showing the diode package size and electrical pinout must be provided by the end-user, and the model number & price may change.
- 5) -P1B (specific pinout option). No further drawings are required. The socket will accept pins 8-14 of a standard butterfly package with 0.5 mm wide pins. A pulse will be applied to the diode anode (pin 10). Pins 8-9 and 11-13 will be grounded. Pin 14 will be made accessible through a solder terminal. Four mounting holes on a 8.9 x 26 mm grid will be provided. The diode parasitic resistance (dV/dI at lasing) must be < 1 Ohm. A low-bandwidth slide-on socket can also be provided for pins 1-7 of the diode, with the thermal control pins brought out to a standard DB-9 connector (-T1B option).
- 6) -P1C (specific pinout option). No further drawings are required. The socket will accept pins 8-14 of a standard butterfly package with 0.5 mm wide pins. A negative pulse will be applied to the diode cathode (pin 12). Pins 8-11 and 13-14 will be grounded. Four mounting holes on a 8.9 x 26 mm grid will be provided. The laser input impedance (dV/dI at lasing) must be 25 Ω (+/- 5 Ω). If the internal resistance is 0 Ω (instead of 25 Ω), use the -P1CR0 suffix instead. Not available on AVX-S3 models. A low-bandwidth slide-on socket can also be provided for pins 1-7 of the diode, with the thermal control pins brought out to a standard DB-9 connector (-T1C option).
- 7) 60 cm / 2 ft, SMA male to SMA male.
- 8) These devices are generally intended for use with Avtech pulse generators (in pulse mode), and are not characterized for CW operation. An estimate of the upper bandwidth limit may be made from the rated rise time. The lower end of the CW passband may be estimated using the maximum rated pulse width.
- 9) Do not exceed the rated power dissipation. For pulse mode operation, the power dissipated in R_S is given by $(I_{PULSE}^2 \times R_S \times PW \times PRF) + (I_{DC}^2 \times R_S)$.
- 10) If the diode resistance (dV/dI at lasing) is greater than one-tenth of R_S , R_S should be reduced. Contact a sales engineer for details (info@avtechpulse.com).
- 11) Do not exceed the rated power dissipation. The power dissipated in R_{DC} is given by $(I_{DC}^2 \times R_{DC})$.

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) 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) if you require assistance.

EC DECLARATION OF CONFORMITY



We Avtech Electrosystems Ltd.
 P.O. Box 5120, LCD Merivale
 Ottawa, Ontario
 Canada K2C 3H5

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 2006/95/EC. 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 2011/65/EU (RoHS)

We Avtech Electrosystems Ltd.
P.O. Box 5120, LCD Merivale
Ottawa, Ontario
Canada K2C 3H5

declare that, to the best of our knowledge, all electrical and electronic equipment (EEE) sold by the company are in compliance with Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (also known as “RoHS Recast”). In addition, this declaration of conformity is issued under the sole responsibility of Avtech Electrosystems Ltd. Specifically, products manufactured do not contain the substances listed in the table below in concentrations greater than the listed maximum value.

<i>Material/Substance</i>	<i>Threshold level</i>
Lead (Pb)	< 1000 ppm (0.1% by mass)
Mercury (Hg)	< 1000 ppm (0.1% by mass)
Hexavalent Chromium (Cr6+)	< 1000 ppm (0.1% by mass)
Polybrominated Biphenyls (PBB)	< 1000 ppm (0.1% by mass)
Polybrominated Diphenyl ethers (PBDE)	< 1000 ppm (0.1% by mass)
Cadmium (Cd)	< 100 ppm (0.01% by mass)

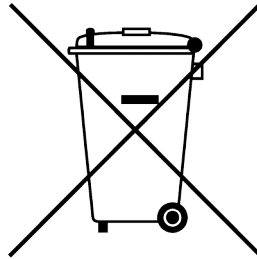
DIRECTIVE 2002/96/EC (WEEE)

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.

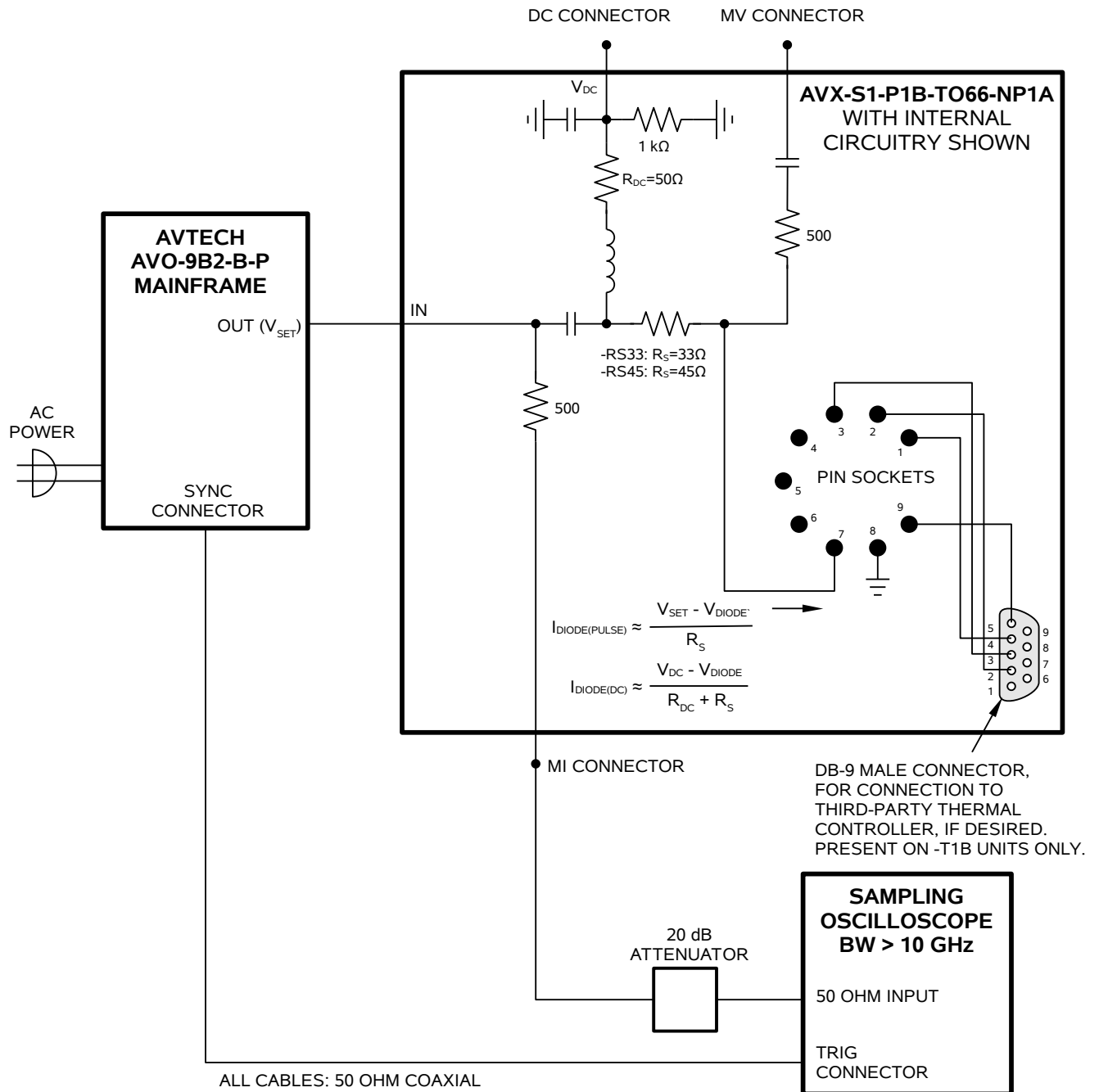
Requirements for WEEE compliance may include registration of products with local governments, reporting of recycling activities to local governments, and financing of recycling activities.



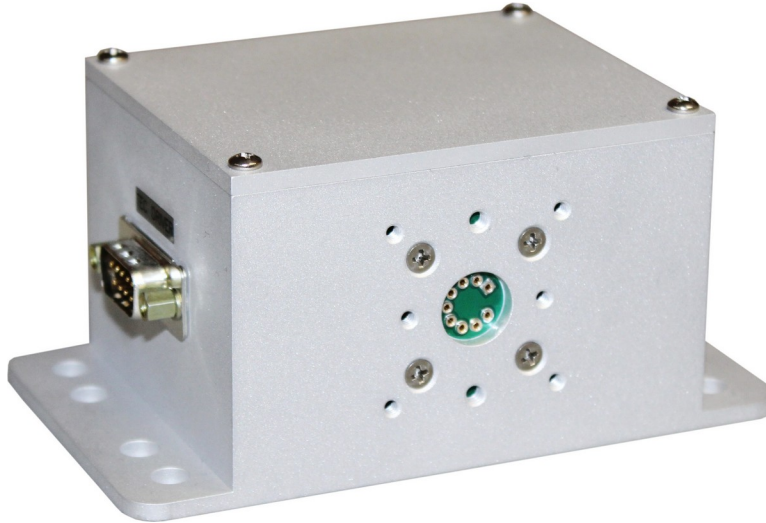
GENERAL INFORMATION

BASIC TEST ARRANGEMENT

To fully test the AVX-S1-TO66-NP1A, and for normal operation, the output module should be connected as shown below:



The diode load is inserted into the socket on the output module, shown below. Two 4-40 mounting holes are provided to secure the TO66 package to the enclosure, to the left and right of the socket area. Four other 4-40 holes are provided on a 30mm grid to accept an optical cage. Two 6-32 holes are also present (above and below the socket area), but they are not used in this configuration. See page 12 for additional mechanical details.



An oscilloscope may be used to monitor the MI and MV outputs, the locations of which are shown in the figure below. A forward DC bias may be applied to the laser diode by connecting a DC potential of 0 to +10 Volts to the DC solder terminal. The application of a small forward bias often yields a more ideal diode current waveform (as observed on the MI port).



AMPLITUDE CONTROL

The pulse current through the diode load installed in the output module is given by:

$$I_{\text{DIODE}} = (V_{\text{SET}} - V_{\text{DIODE}}) / R_{\text{S}}$$

where V_{SET} is the amplitude setting on the pulser, V_{DIODE} is the forward voltage drop across the diode (typically 2 or 3V), and R_{S} is 33 Ohms on units with the -RS33 option, and 45 Ohms on units with the -RS45 option.

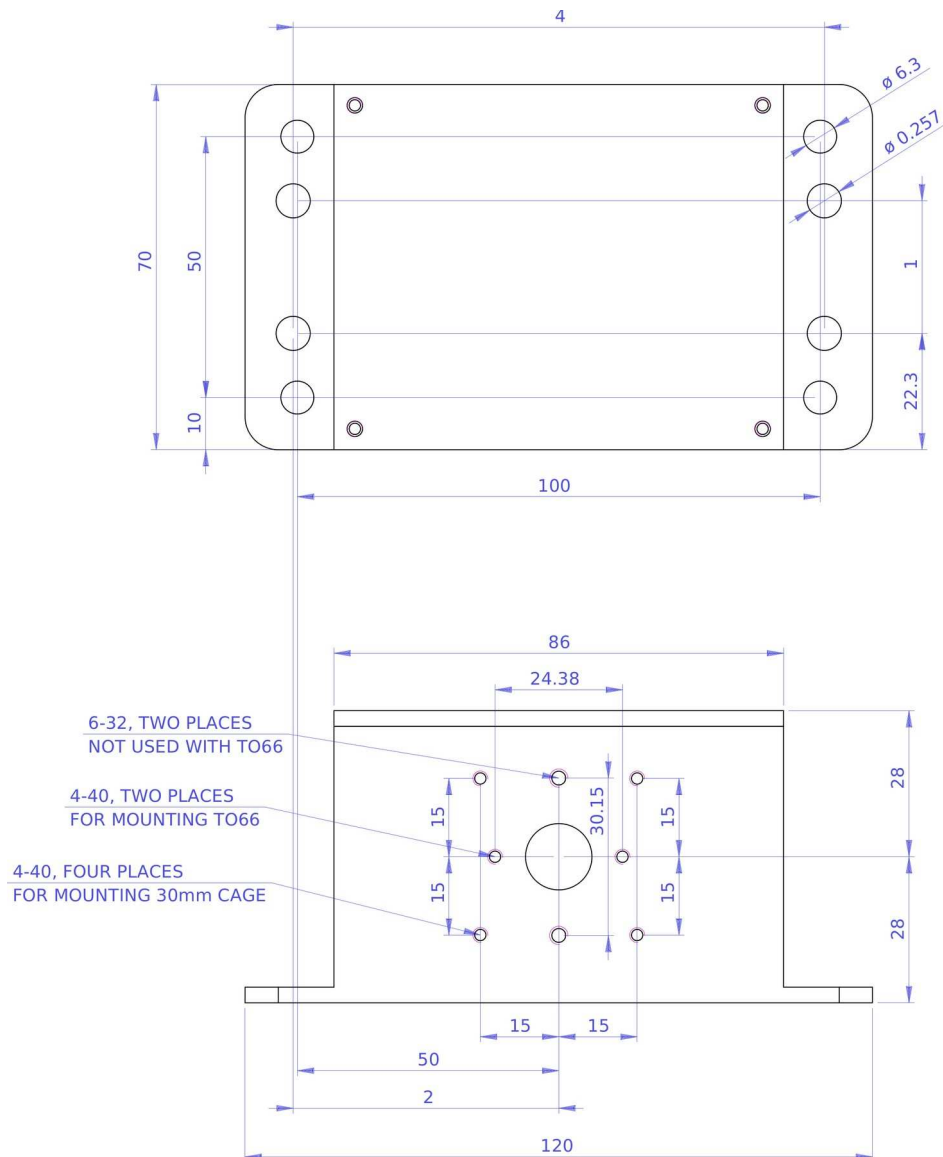
MECHANICAL DIMENSIONS

The AVX-S1-TO66-NP1A enclosure is provided with 8 mounting holes on its mounting flanges. Four are placed on a 1" grid, and four are placed on a 25 mm grid, for maximum flexibility.

Four 4-40 threaded holes on a 30 mm grid are located near the DUT, to allow third-party optical cages to be mounted to the enclosure.

Two 4-40 threaded holes are provided (24.38 mm apart) to allow the TO66 package to be bolted to the enclosure.

Two 6-32 threaded holes are also provided (30.15 mm apart), but they are not used in this configuration.



PERFORMANCE CHECKSHEET