



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 +1-613-226-5772 (Intl)
FAX: 800-561-1970 (USA & Canada) or +1-613-226-2802 (Intl)

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

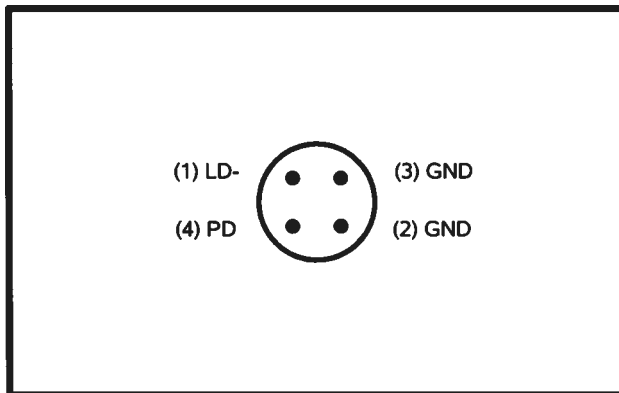
BOX 5120, LCD MERIVALE
OTTAWA, ONTARIO
CANADA K2C 3H4

INSTRUCTIONS

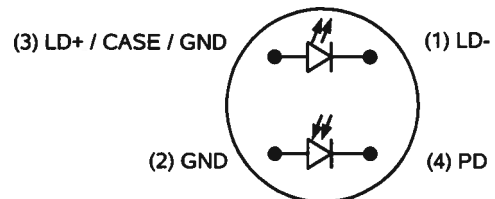
MODEL AVX-S1-INV-MD-P2-SUA

PLUG-IN SOCKET OUTPUT MODULE

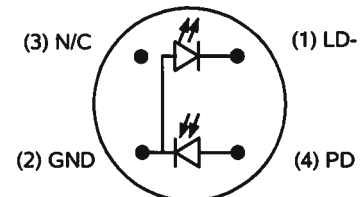
SERIAL NUMBER: 11702



AVX-S1 OUTPUT MODULE, SOCKET VIEW



OR



**MATCHING USER-SUPPLIED
DIODE PACKAGES
(BOTTOM VIEW).
5.6 mm PACKAGE.**

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 +1-613-226-5772 (Intl)

Fax: 800-561-1970 (USA & Canada) or +1-613-226-2802 (Intl)

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
ORIGINAL QUOTATION.....	5
SPECIFICATIONS.....	7
EUROPEAN REGULATORY NOTES.....	8
EC DECLARATION OF CONFORMITY.....	8
DIRECTIVE 2002/95/EC (RoHS).....	8
DIRECTIVE 2002/96/EC (WEEE).....	8
GENERAL INFORMATION.....	10
BASIC TEST ARRANGEMENT.....	10
AMPLITUDE CONTROL.....	12
MOUNTING BRACKET.....	12

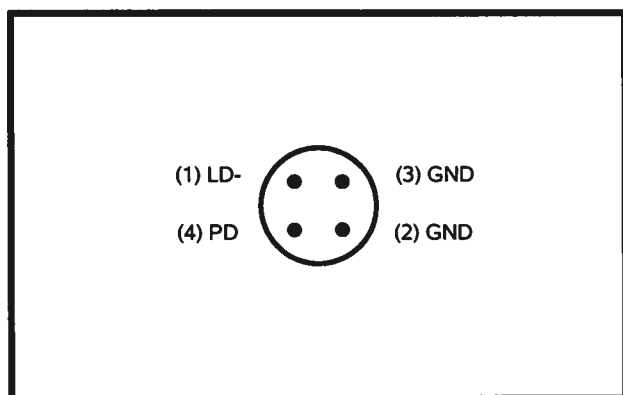
Manual Reference: T:\instructword\avx-s\AVX-S1-INV-MD-P2-SUA,sn11702.odt.
 Last modified March 21, 2007.
 Copyright © 2007 Avtech Electrosystems Ltd, All Rights Reserved.

INTRODUCTION

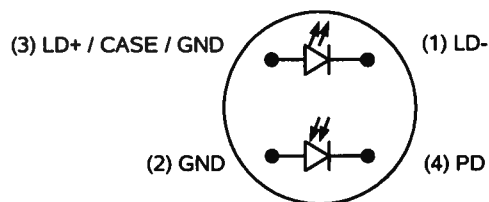
The AVX-S series of bias insertion units is designed to combine a pulse signal with a DC bias, and supply the resulting signal to a laser diode, which is inserted into a high quality socket included on the mount. The bias insertion module includes the necessary networks to match the laser diode to the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

This bias insertion unit is intended for use with an existing AVMM-2-EW-P pulse generator. The AVX-S1-INV-MD-P2-SUA includes an internal inverting transformer, so that the positive output of the AVMM-2-EW-P can be inverted to drive the laser diode cathode.

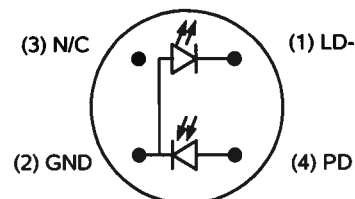
The AVX-S1-INV-MD-P2-SUA is specifically designed to accommodate 4-pin 5.6mm diodes with the pinouts illustrated below, such as the PD-LD PL 13/15 series:



AVX-S1 OUTPUT MODULE, SOCKET VIEW



OR



**MATCHING USER-SUPPLIED
DIODE PACKAGES
(BOTTOM VIEW).
5.6 mm PACKAGE.**

ORIGINAL QUOTATION

Date: Fri, 23 Feb 2007 10:20:30 -0500
From: Avtech Sales
To: XXXXX
Stockholm University

XXXXX,

I am enclosing a revised quotation, with lower shipping costs. Our default formula for calculating freight and insurance charges does not work well for the smaller items. Please note however that the -P2 option costs \$121 US before discount; that was not included in your calculations.

The case pin is always grounded, to avoid capacitive effects that could degrade performance significantly. That is why the -INV option is included.

I am pleased to quote as follows:

Quote number: 13665

Model number: AVX-S1-INV-MD-P2-SUA

Description: Laser Diode Bias Insertion Unit with Socket

-MD-P2-SUA options: The socket is configured to accept the 4-pin 5.6-mm case PL 13/15 series of diodes, described in the datasheet at <http://www.pd-ld.com/pdf/LDFBSeries.PDF>. Both type "H" and "T" pinouts will be accepted. Pins 2 and 3 will be grounded. The output signal will be applied to pin 1, the laser cathode. Pin 4 (photodiode anode) will be made accessible through a low-bandwidth solder terminal. A matching bracket will be provided so that the two mounting holes of the of the type 10941 bracket (described in PD-LD drawing 195-10941-A) can be screwed down. It is important that the case pin (pin 3) be aligned as it is shown in this drawing, so that the sockets and brackets will align correctly. That is, when the straight portion of the 10941 bracket is oriented horizontally below the device pins, and the pins are viewed from end of the pins, then the case pin (pin 3) must be in the lower-right position.

Note: the PD-LD pin numbering is not sequential, it goes 1, 4, 2, 3, in a clockwise direction.

-INV option: Since this module will be used with AVMM-2-EW-P pulsers (positive), and inverting transformer will be installed in the module so that a negative signal may be applied to the laser cathode.

Pricing, manuals, datasheets: <http://www.avtechpulse.com/laser-bias/avx-s1>

PDF datasheet:

http://www.avtechpulse.com/catalog/page074_cat11_avx-s_rev4.pdf

Price: \$XXXXX US each, CIF Sweden. Includes 5% academic discount. Includes the cost of freight and insurance, but excludes customs duties, taxes, and other fees.

Quote valid for: 60 days

Estimated delivery: 2-3 weeks after receipt of order.

Regards,

Mary Budarick
Sales Manager

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

PO Box 265	ph: 888-670-8729 or 613-226-5772	Box 5120
Ogdensburg	fax: 800-561-1970 or 613-226-2802	LCD Merivale
New York		Ottawa, Ontario
USA 13669-0265	email: info@avtechpulse.com	Canada K2C 3H4
	http://www.avtechpulse.com/	

Pulse Generators - Laser Diode Drivers - HV Amplifiers
Monocycle Generators - Impulse Generators - Pulse Amplifiers
Current Pulsers - Function Generators - Frequency Dividers - and more!

SPECIFICATIONS

Model:	AVX-S1
Peak diode current:	200 mA
Max. input amplitude:	10 Volts
Pulse width:	0.4 ¹ - 10 ns
Rise time:	0.2 ns ¹
Pulse PRF range:	DC - 25 MHz
Max. bias current:	100 mA
Max. bias voltage:	50 Volts
Input impedance:	50 Ohms
N (transformer ratio ^{2,3}):	1
R _S + R _{DIODE} :	50 Ohms
IN connector:	SMA female (one)
Other connectors:	MV, MI, MD: SMA (female), DC bias: solder terminal
Diode socket:	-P0 option: for 3-pin 9mm TO-18 package ⁴ -P1 option: for generic butterfly package, see footnote ⁴ -P2 option: for 3-pin 5.6mm package ⁴ -P1B option: for specific butterfly package, see footnote ⁵ -P3 option: for 8-pin DIP package ⁴ -P1C option: for specific butterfly package, see footnote ⁶ -TO3 option: for TO-3 package ⁴ <i>Other sockets available upon request.</i>
Dimensions:	H x W x D: 41 mm x 66 mm x 76 mm (1.6" x 2.6" x 3.0")
Material:	Cast aluminum, blue enamel

- 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 50Ω / N² (approx).
- 3) A polarity inverting option is available. Add the suffix -INV to the model number to specify this option. "N" is a negative number 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 and 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 Ohms (+/- 5 Ohms). Not available on AVX-S3 models, or models with the -HC suffix. 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).

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.

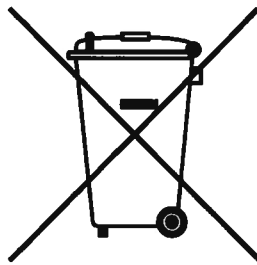
DIRECTIVE 2002/96/EC (WEEE)

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.

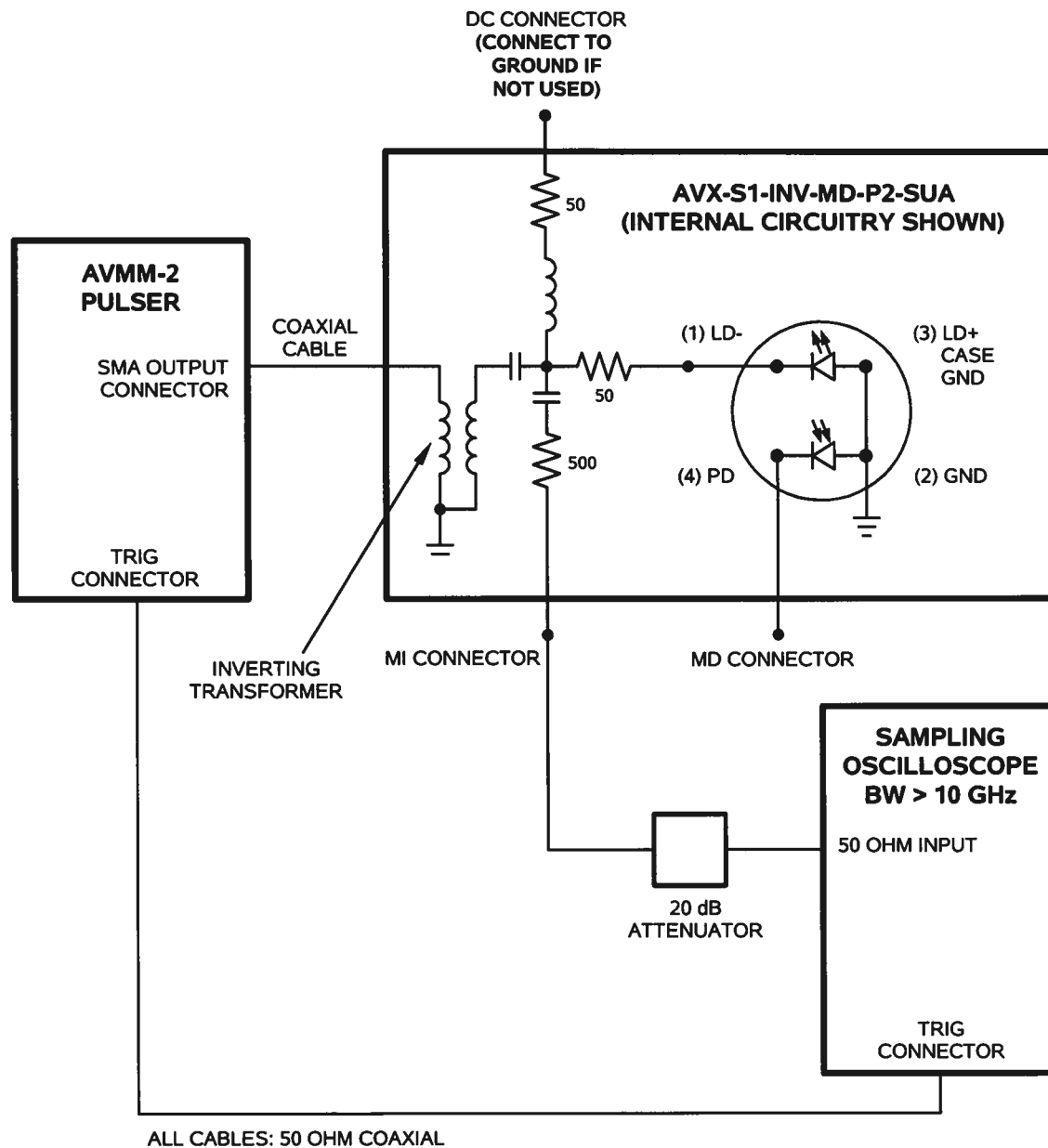
Requirements for WEEE compliance may include registration of products with local governments, reporting of recycling activities to local governments, and financing of recycling activities.



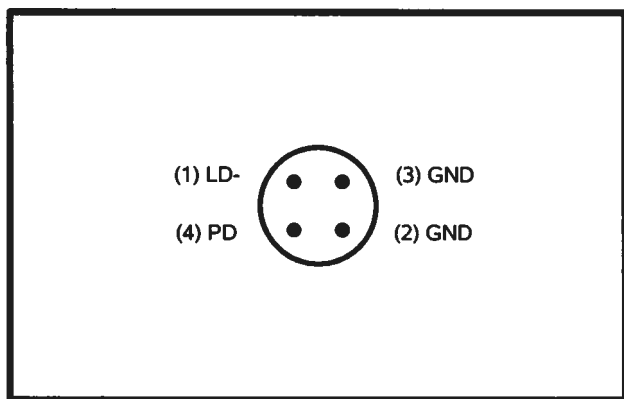
GENERAL INFORMATION

BASIC TEST ARRANGEMENT

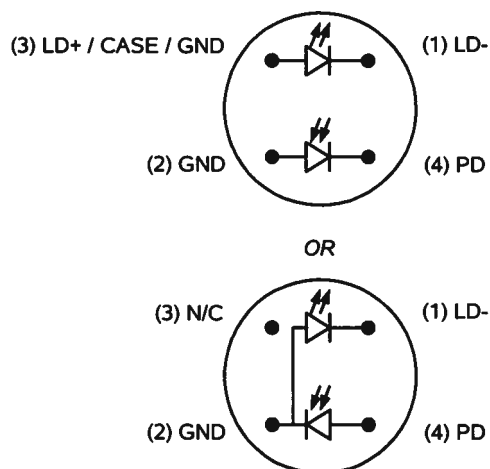
To fully test the AVX-S1-INV-MD-P2-SUA, and for normal operation, the output module should be connected as shown below:



The diode load is inserted into the socket on the output module. The mechanical layout of the socket is shown below:

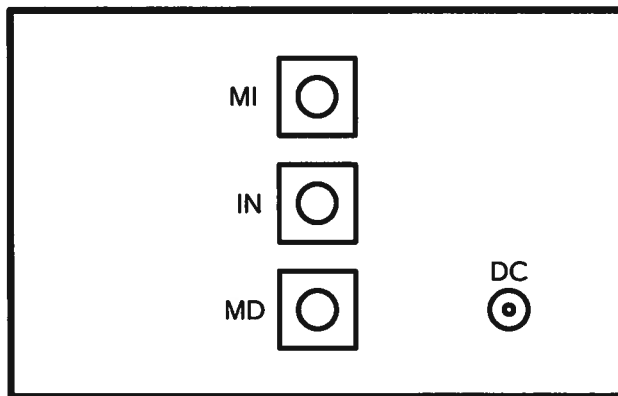


AVX-S1 OUTPUT MODULE, SOCKET VIEW



MATCHING USER-SUPPLIED DIODE PACKAGES (BOTTOM VIEW). 5.6 mm PACKAGE.

NOTE: Trim the diode leads to **no longer than 1.0 cm in length**. If the leads are longer than that, they may cause an internal short circuit in the output module, which may cause damage to the diode and the output module.



AVX-S1-INV-MD-P2-SUA OUTPUT MODULE, CONNECTOR VIEW

An oscilloscope may be used to monitor the MI and MD outputs, the locations of which are shown in the figure above. A forward DC bias may be applied to the laser diode by connecting a DC potential of 0 to -5 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). Note that the DC port must be shorted to ground if a bias is not applied.

AMPLITUDE CONTROL

The pulse current through the diode load is given by:

$$I_{\text{DIODE}} = (V_{\text{PULSER}} - V_{\text{DIODE}}) / (50\Omega + R_{\text{DIODE}})$$

where V_{PULSER} is the amplitude of the AVMM-2-EW-P pulse generator output (between 0 and +5V), V_{DIODE} is the forward voltage drop across the diode (typically 2V), and R_{DIODE} is the resistor internal to the laser diode (approximately 0Ω). The 50Ω resistance is built into the AVX-S1-INV-MD-P2-SUA.

It is possible to boost the maximum pulse current by using the DC offset input to bias the diode just below threshold. (When the DC offset is not used, it MUST be grounded.)

MOUNTING BRACKET

A removable mounting bracket is installed above the device socket, such that the two mounting holes of the of the type PD-LD type 10941 bracket (described in PD-LD drawing 195-10941-A) can be screwed down. It is important that the case pin (pin 3) be aligned as it is shown in this drawing, so that the sockets and brackets will align correctly. That is, when the straight portion of the 10941 bracket is oriented horizontally above the device pins, and the pins are viewed from end of the pins, then the case pin (pin 3) must be in the upper-left position.

The bracket may be removed, if desired.

March 23/07