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-2-P-M-T1B-P1B-ACTA

350 mA, 200 ps RISE TIME

HIGH PERFORMANCE LASER DIODE DRIVER MODULE

WITH PLUG-IN SOCKET

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-2-P-M-T1B-P1B-ACTA,ed1.odt.
Last modified February 29, 2024.

INTRODUCTION

The AVM-2-P-M-T1B-P1B-ACTA is a high performance DC-powered laser diode driver capable of generating up to +350 mA of current into QSOA-1050 laser diode loads, at repetition rates up to 4 MHz. The pulse width is adjustable from 0.5 to 3 ns. The rise time is less than 200 ps, and the fall time is less than 300 ps.

The AVM-2-P-M-T1B-P1B-ACTA consists of two separate modules, the pulse generator module and the output module. The two modules are connected by a length of coaxial cable. The pulse generator module requires +24 V DC power.

The AVM-2-P-M-T1B-P1B-ACTA provides a socket into which the user's QSOA-1050 laser diode may be inserted. The output module contains the necessary elements to match the laser diode to the pulse generator module. A DC bias current of 0 to +100 mA may be applied to the laser diode by applying the desired DC current to a terminal pin on the output module. The module includes an SMA output connector that provides an attenuated coincident replica of the diode current.

The AVM-2-P-M-T1B-P1B-ACTA must be triggered by an externally-generated TTL-level pulse.

This instrument is intended for use in research, development, test and calibration laboratories by qualified personnel.

SPECIFICATIONS

Model:	AVM-2-P-M-T1B-P1B-ACTA
Amplitude, standard:	+25 to +350 mA
Diode load:	QSOA-1050
Pulse width (FWHM):	0.5 - 3 ns
Maximum PRF:	4 MHz
Rise time (20%-80%):	≤ 200 ps
Fall time (20%-80%):	≤ 300 ps
Related 50Ω series:	AVM-2
Polarity:	Positive
Propagation delay:	≤ 150 ns (Ext trig in to pulse out)
Jitter:	± 35 ps ± 0.015% of sync delay (Ext trig in to pulse out)
DC offset or bias insertion:	Apply required DC bias current in the range of ± 100 mA to solder terminal on output module.
Trigger required: (ext trig mode)	+3 to +5V (TTL), ≥ 50 ns
Connectors: Out: Other:	-P1B socket, -T1B socket Trig, Monitor: SMA
Power requirements:	+24V DC
Temperature range:	+5°C to +40°C

ORIGINAL QUOTATION

Date: Tue, 25 May 2010 09:36:47 -0400
From: Avtech Sales
Subject: Re: Driver for QPhotonics SOA
May 25, 2010

XXXXX,

I am pleased to re-quote with the -M option:

Quote number: 15252

Model number: AVM-2-P-M-T1B-P1B-ACTA

Description: Laser Diode Driver (Pulsed Voltage) consisting of a modified AVM-2-P-M module and a AVX-S1 output module to accept the QSOA-1050 diode.

Polarity: positive

Amplitude: 25 to 350 mA, adjustable using a one-turn trimpot.

Maximum output of mainframe to 50 Ohms: +20 Volts (for a maximum current of 400 mA)

Rs + Rdiode: 50 Ohms

Pulse width (FWHM): 0.5 to 3 ns, adjustable using a one-turn trimpot.

Maximum PRF: 4 MHz. Controlled by input TTL trigger.

Rise times (20%-80%): < 200 ps

Fall times (20%-80%): < 300 ps

Related series: AVM-2-C and AVX-S1

Other: See http://www.avtechpulse.com/laser/avm and http://www.avtechpulse.com/laser-bias/avx-s1/.

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.

Terms: Payment in advance 2 weeks prior to shipping, preferably by bank transfer or credit card.

Quote valid for: 8 weeks

Estimated delivery: 6-8 weeks after receipt of order (excluding export permit* delays).

*Export Permit: These instruments are very high performance pulse generators, which are considered to be "Nuclear-Related Dual-Use Goods" under government regulations. As such, an "End Use Statement - High Speed Models" form must be completed when ordering. The necessary form

is attached (in PDF format), and is also available at http://www.avtechpulse.com/end-use/EndUseStatement,HighSpeed,v6.pdf. We will use the information in the completed form to apply for an export license from the Canadian government, which will take 1 to 6 weeks to obtain. We cannot ship your order without the license. Please return the completed form to us by fax.

Regarding DC power supplies: We use Sorensen (formerly Xantrex) DC power supplies for our internal tests. See:

http://www.sorensen.com/products/Products_Bench.php

There are many other suppliers of quality DC power supplies (Agilent, Kepco, etc) that would also be suitable. Avoid the super-cheap models from less reputable manufacturers.

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

REGULATORY NOTES

FCC PART 18

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

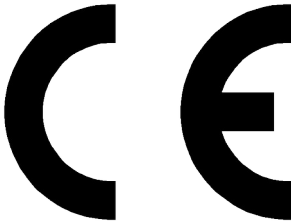
This instrument is enclosed in a rugged metal chassis and uses a filtered power entry module (where applicable). The main output signal is provided on a shielded connector that is intended to be used with shielded coaxial cabling and a shielded load. Under these conditions, the interference potential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

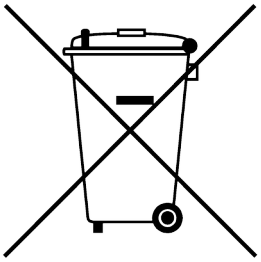
This instrument is exempt from Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the Restriction of the use of certain Hazardous Substances (RoHS) in electrical and electronic equipment. Specifically, Avtech instruments are considered "Monitoring and control instruments"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



PULSE GENERATOR MODULE

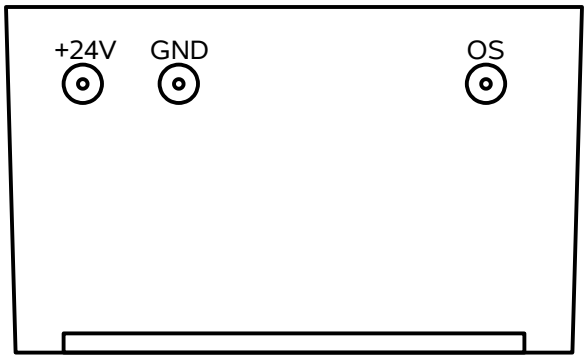
CONTROLS

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.

The “M” monitor output provides an attenuated (-20 dB, ÷10, approximately) replica of the signal on the “OUT” connector, for monitoring purposes. When used, this output must be terminated with 50 Ohms.

The +24V DC power terminal and the ground terminal are located on the opposite side of the module, as shown below:



The OS input is not normally used in the AVM-2-P-M-T1B-P1B-ACTA.

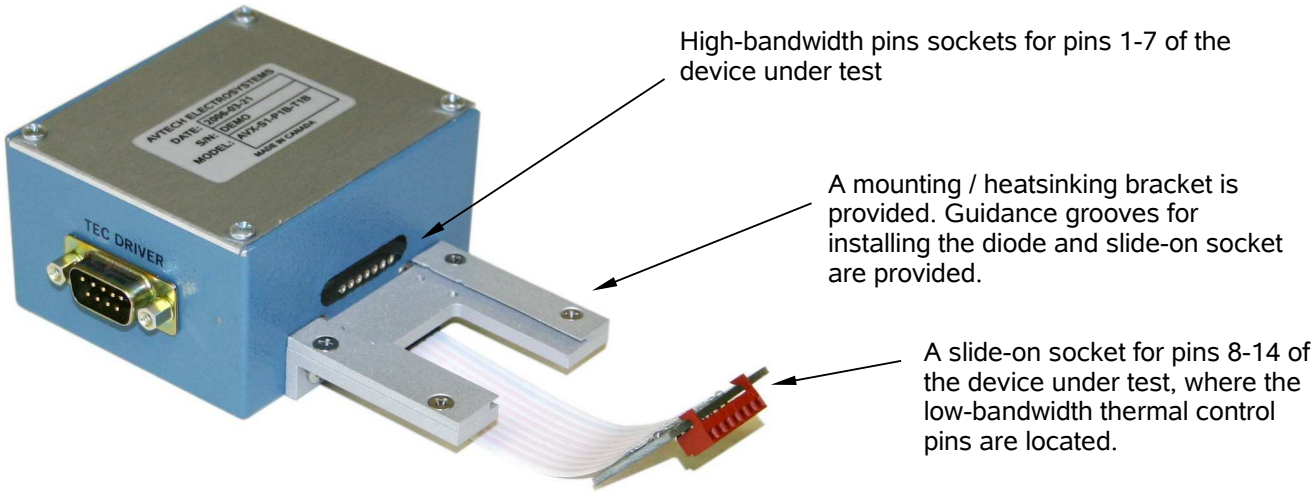
INSTALLING THE DEVICE UNDER TEST

The output module will has a high-speed socket for pins 1-7 of the diode under test. A slide-on socket for pins 8-14 of the diode is also present.

The high-speed socket consists of seven high-bandwidth pin sockets. This socket arrangement will accept pins 1-7 of the Qphotonics QSOA-1050 butterfly package. A positive pulse will be applied to the diode anode (pin 4). Pins 2-3 and 5-7 will be grounded.

The slide-on socket consists of a low-bandwidth slide-on socket board for pins 8-14 of the butterfly package. A flexible cable connects the slide-on socket to the output module. 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 11 (TH). DB-9 pin 3 connects to diode pin 12 (TH). DB-9 pin 4 connects to diode pin 1 (TEC+). DB-9 pin 5 connects to diode pin 14 (TEC-). The remaining DB-9 pins are unconnected. This option is designed for compatibility with certain Thorlabs temperature controllers. It may be suitable for others as well.

With no diode installed, the module will look similar to this:



The diode is first installed by sliding pins 1-7 into the pin sockets, as shown below:

Gently slide the high-bandwidth side of the device under test into the matching pin sockets. The device can be screwed down to the bracket, if desired.

The slide-on socket assembly can then be slid onto pins 8-14, as shown below:

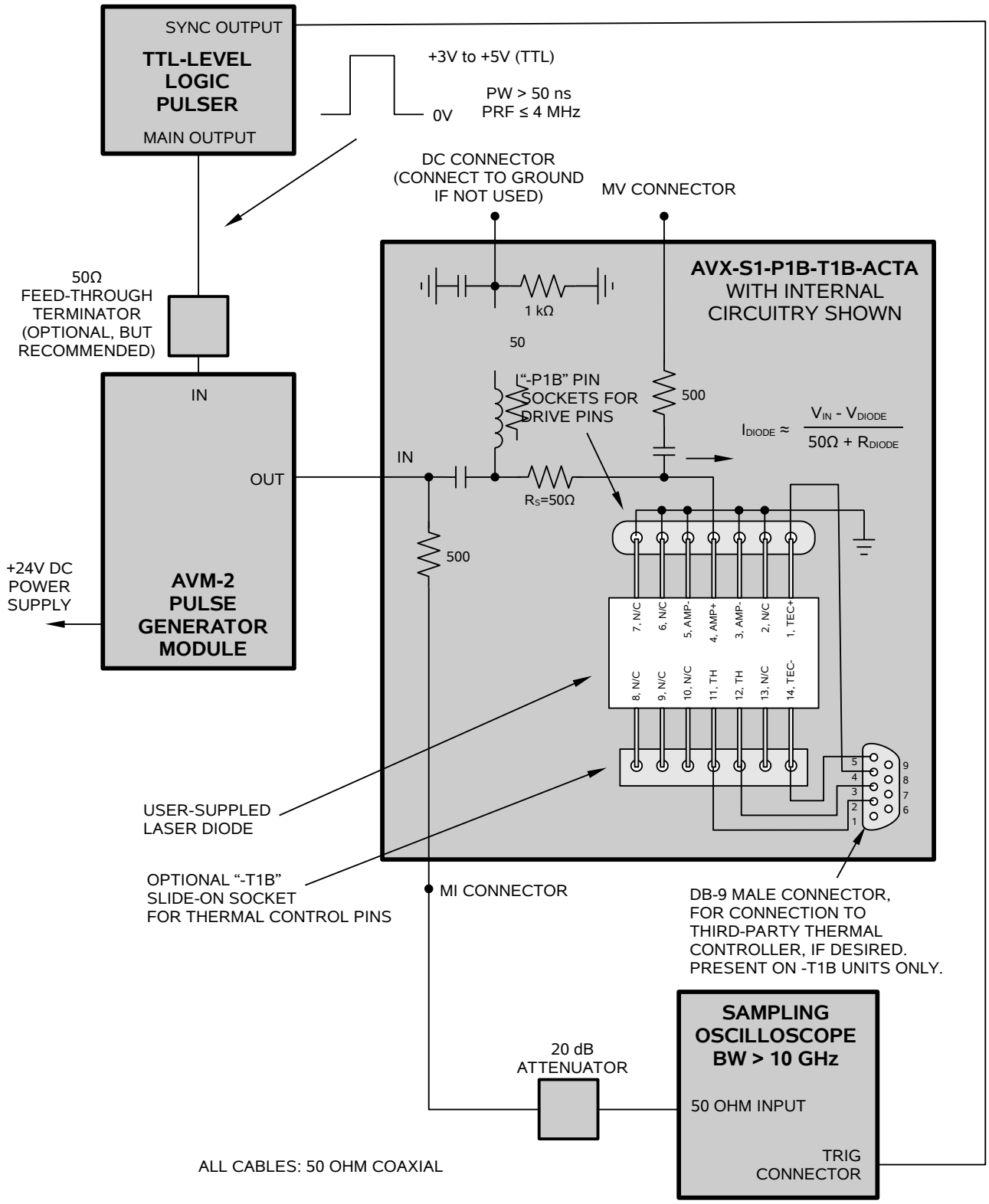
Gently slide the low-bandwidth slide-on socket onto the matching pins of the device under test. The slide-on socket is connected to the output module using a short length of flexible ribbon cable. The thermoelectric cooler and thermistor pins are made accessible to the user through the “TEC DRIVER” DB-9 connector, which will mate to cables from common third-party TEC controllers.

(The SMA connectors which connect to the cabling from the mainframe are on the module side opposite the pin socket. They are not visible in these photos.)

To optional third-party TEC controller.

The diode shown in the photos above is not a QPhotonics QSOA-1050, so the actual DUT will look different.

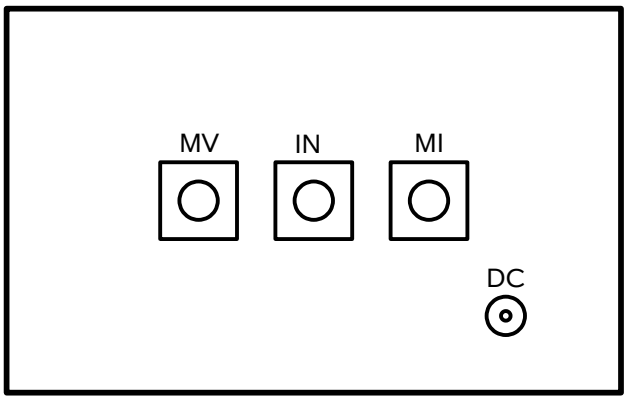
NORMAL TEST ARRANGEMENT



SIGNAL CONNECTORS ON THE OUTPUT MODULE

An oscilloscope may be used to monitor the MI and MV outputs. 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).

⚠ Note that the DC port must be shorted to ground if a bias is not applied. Waveform distortions will occur otherwise.



AVX-S1-P1B OUTPUT MODULE, CONNECTOR VIEW

THERMAL CONTROL

This model includes a DB-9 male connector that will mate to third-party temperature controllers. These third-party controller provide a means of controlling the thermoelectric cooler that is typically present in butterfly-packaged laser diodes, if desired. The need for cooling is dependent on the user's application. Cooling is generally recommended by device manufacturers.

AMPLITUDE CONTROL

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

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

where V_{SET} is the amplitude of the internal high-speed voltage pulse generator module (between 0 and 20V), V_{DIODE} is the forward voltage drop across the diode (typically 2 or 3V), and R_{DIODE} is typically negligible (compared to the 50 Ohm series resistance).

PROTECTING YOUR INSTRUMENT

DO NOT EXCEED 4 MHz

The output stage may be damaged if triggered by an external signal at a pulse repetition frequency greater than 4 MHz.

PERFORMANCE CHECKSHEET