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SINCE 1975

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INSTRUCTIONS

MODEL AVX-S1-UTB BIAS INSERTION UNIT

S.N.:

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: 613-226-5772 or 1-800-265-6681

Fax: 613-226-2802 or 1-800-561-1970

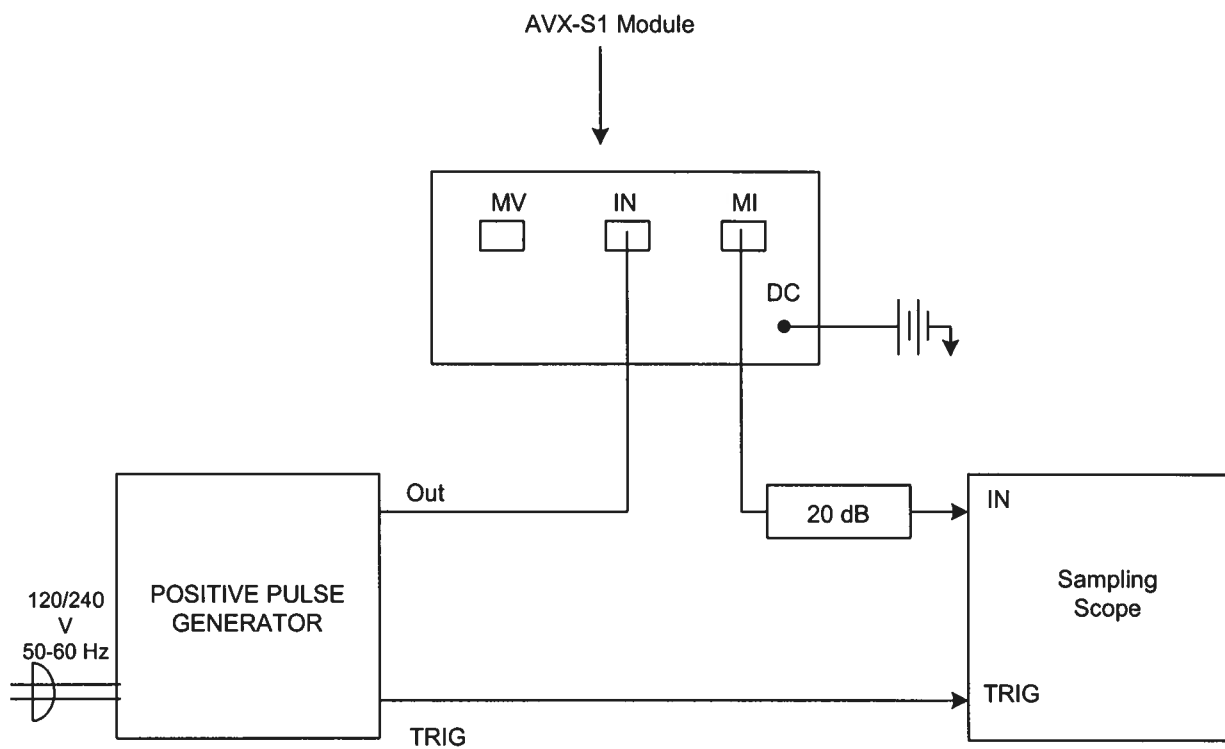
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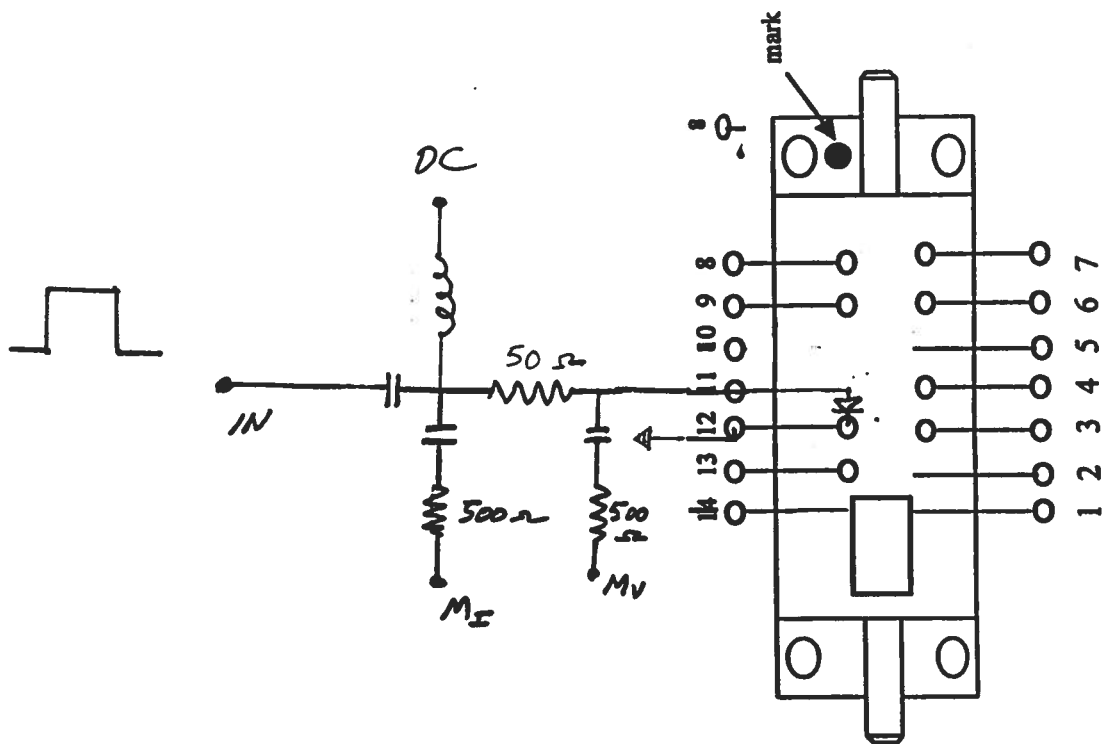
FIG. 1: PULSE GENERATOR TEST ARRANGEMENT (AVX-S1 Module Connected)



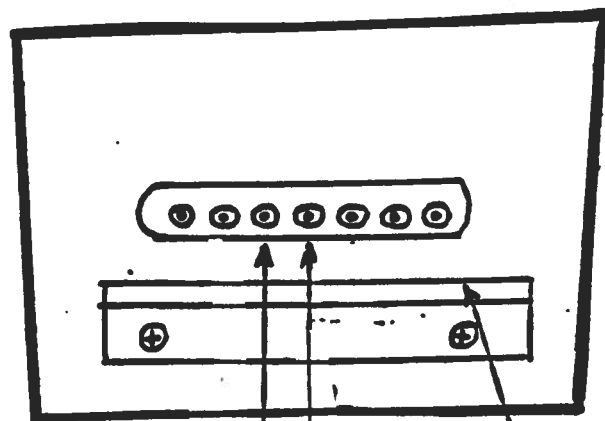
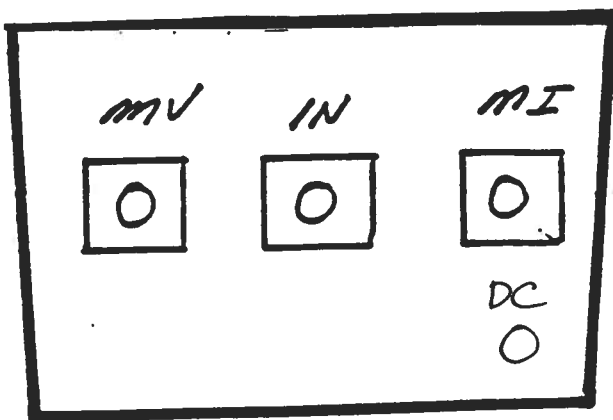
GENERAL OPERATING INSTRUCTIONS

- 1) The AVX-S1 module should be connected to the pulse source mainframe via the supplied 24" RG174 cable.
- 2) Gently insert the diode package leads into the 7-pin socket assembly. Pins 8 to 14 contact the AVX-S1 pin sockets. Pin 11 contacts the diode anode. Pin 12 contacts the cathode and is grounded.
- 3) The diode package may be secured in position by installing four 2-56 Philips screws in the four tapped holes in the mounting ledge. It may be necessary to loosen the two 4-40 Philips screws to reposition the height of the L-shaped monitor ledge.
- 4) A forward DC bias may be applied to the laser diode by connecting 0 to +5VDC to the DC solder terminals. 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.
- 5) Connect the MI port to a scope via 20-dB attenuator.
- 6) The diode pulse current (Amps) and the Voltage at M_I (Volts) are related as follows:
$$I_D = 0.2 (V_{MI} -) V_D = 10V_{MV}$$
- 7) For additional assistance:
Tel: 613-226-5772
Fax: 613-226-2802
Email: info@avtechpulse.com

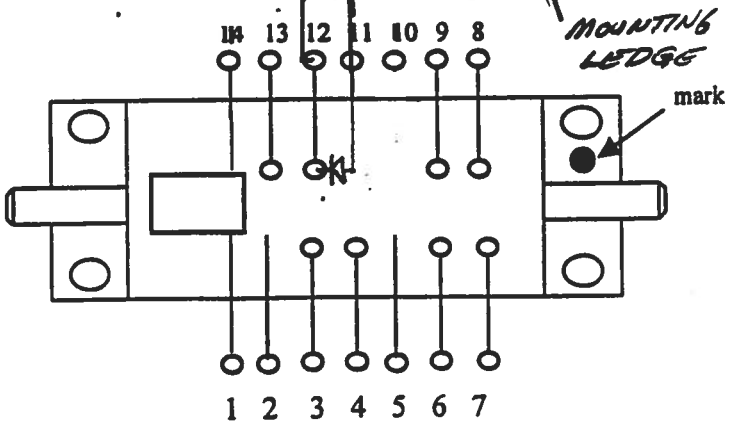
AVX-S1, S.N. 9775

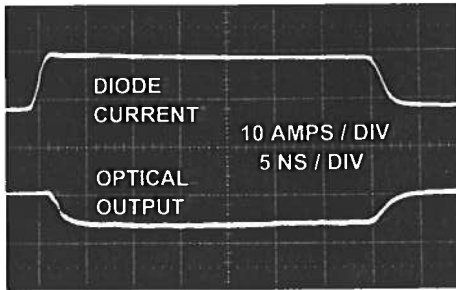


FUNCTIONAL EQUIVALENT CIRCUIT



PACKAGE





The AVX-S series of bias insertion units is designed to combine a pulse or RF CW 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 or RF source as well as networks for applying DC bias to the diode. An output for monitoring the diode current is included, and optional outputs allow for monitoring of the laser diode voltage and a photo detector diode output. Readily available socket configurations (TO-18, TO-5, TO-3, OP-3) are shown on the following page. Note that the laser diodes are not supplied with the AVX-S series.

The AVX-S series includes 3 basic models, namely the AVX-S1, AVX-S2 and the AVX-S3. The basic functional equivalent circuits for the three models are shown in Figures 1, 2, and 3 on page 75. Model AVX-S1 is specifically designed for ultra high-speed, low current applications (rise times as low as 200 ps, bandwidths to 100 MHz, $I < 1.0$ Amp). Model AVX-S1 is employed in the AVO-9-C series of diode drivers. Model AVX-S2 is intended for application with rise times greater than 2 ns and currents above 1 Ampere. Model AVX-S3 is specifically designed for use with the AVO-2 and AVO-5 series pulse generators (which provide currents in the range of 5 to 50 Amperes).

The input series blocking capacitor in Models AVX-S1 and AVX-S2 presents a low impedance to RF CW signals and to baseband pulses, while the shunt inductor presents a high impedance to RF (or pulse) signals but an extremely low impedance to the DC bias. The resistor in series with the laser diode is selected to insure that the impedance at the IN port is 50 Ohms. Normally a laser diode resistance of 3 Ohms is assumed.

The diode current monitor (M_I) is a standard feature that provides an output waveform (to 50 Ohms) which is an attenuated replica of the laser diode current. The output amplitude (V_{MI} , Volts) and diode current (I_D , Amps) are related as follows:

Fig. 1: $I_D = 0.2 (V_{MI} - V_{MV})$ Fig. 2: $I_D = 0.2 V_{MI}$

The optional diode voltage monitor (MV) provides an output waveform that may be related to the voltage across the laser diode (V_D , Volts) as follows:

Fig. 1: $V_D = 10 V_{MV}$ Fig. 2: $V_D = 10 (V_{MV} - V_{MI})$

The $-M_D$ option provides a connection to a photo diode detector output.

- Socket mounting of laser diodes
- Peak currents from 100 mA to 48 Amperes
- Pulse widths from 0.4 to 200 ns
- Rise times from 0.2 to 2.0 ns
- Pulse or CW RF
- Diode voltage monitor and photodiode output options

Model AVX-S3 is available in four different versions (AVX-S3A, AVX-S3B, AVX-S3C and AVX-S3D) all of which include a matching transformer which effectively boosts the laser diode current beyond that provided by the pulse source.

Model AVX-S3A is designed to match 50 Ohm pulse generators such as Model AVO-2-C to 12 Ohm loads with peak currents of 5 Amperes. Consequently, the resistor R_S in the equivalent circuit for this model is 10 Ohm. This resistor is accessible in all AVX-S3 models and may be changed by the user (by desoldering). The series resistance of the laser diode and the resistor R_S must equal the pulse generator source impedance divided by N^2 . Consequently, if the series resistance of the laser diode is relatively high, it then may be necessary to reduce the value of R_S . Model AVX-S3B is designed to match 50 Ohm pulse generators such as Model AVO-5-C to 3 Ohms and will provide peak diode currents up to 28 Amperes. Model AVX-S3C is designed to match Models AVO-2W-C and AVO-2-C (25 Ohm source impedance) to load resistance of about 5 Ohms and will provide peak diode currents as high as 10 Amperes. Model AVX-S3D is designed for use with Model AVO-5B-C and will provide up to 48 Amperes of diode current.

One (or two) SMA output connectors provide attenuated coincident replicas of the diode current ($-M_I$, current monitor feature) and diode voltage ($-MV$ option) as per the following relationships (Amps, Volts):

$$I_D = \frac{10V_{MI}}{R_S} \qquad V_D = 10 (V_{MV} - V_{MI})$$

All AVX-S3 units include two foot long input cables with SMA male connectors.

When ordering members of the AVX-S family, the customer must specify the basic model number (e.g. AVX-S1) and the following additional information:

- Diode package type (e.g. TO-18) and the required pin connections (e.g. anode, cathode, ground, etc.). See the following page for readily available package mounting. Contact Avtech for special or different packages.
- Desired options (e.g. $-MV$, $-MD$).

Contact Avtech for your special requirements.



SPECIFICATIONS

AVX-S SERIES

Model:	AVX-S1	AVX-S2	AVX-S3A	AVX-S3B	AVX-S3C	AVX-S3D
Peak diode current:	400 mA	2 Amps	5 Amps	28 Amps	10 Amps	48 Amps
Max. input amplitude:	20 Volts	100 Volts	150 Volts	350 Volts	150 Volts	150 Volts
Pulse width (ns):	0.4 - 200	1 - 1000	2 - 100	2 - 100	2 - 100	5 - 500
Rise time (ns):	0.2	0.5	0.5	1.0	0.5	2.0
Pulse PRF range:	DC - 100 MHz	DC - 20 MHz	DC - 10 MHz	DC - 10 MHz	DC - 10 MHz	DC - 1 MHz
CW frequency range:	10 - 100 MHz	1 - 20 MHz	-	-	-	-
Max. bias current:	100 mA	100 mA	100 mA	100 mA	100 mA	100 mA
Max. bias voltage:	50 Volts	50 Volts	50 Volts	50 Volts	50 Volts	50 Volts
Input impedance:	50 Ohms	50 Ohms	50 Ohms	50 Ohms	25 Ohms	12 Ohms
N:	-	-	2	4	2	4
R _s (Ohms):	-	-	10	3	5	0.7
IN connector:	SMA					
Monitor connector:	SMA					
Bias connector:	Solder pin					
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					
Mounting:	Any					

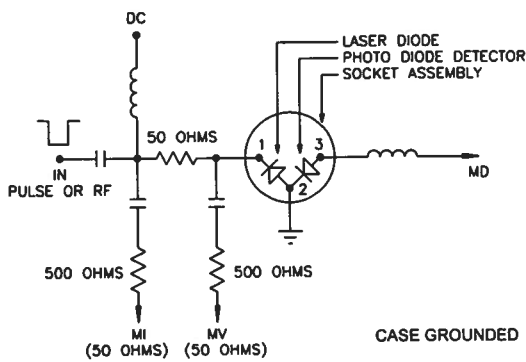


Fig. 1 - AVX-S1 and AVX-S2 functional equivalent circuit (preferred configuration)

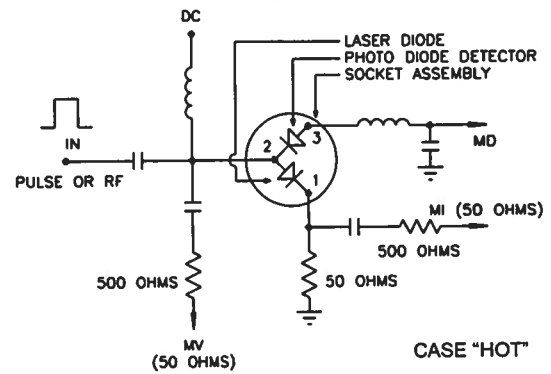


Fig. 2 - AVX-S1 and AVX-S2 functional equivalent circuit (alternative configuration)

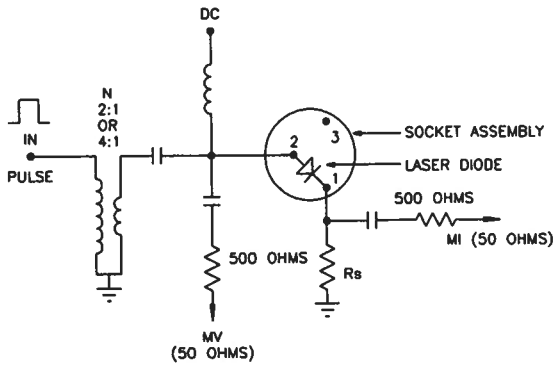


Fig. 3 - AVX-S3 functional equivalent circuit

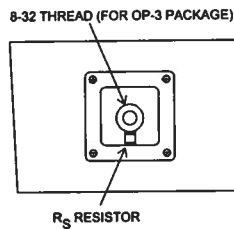
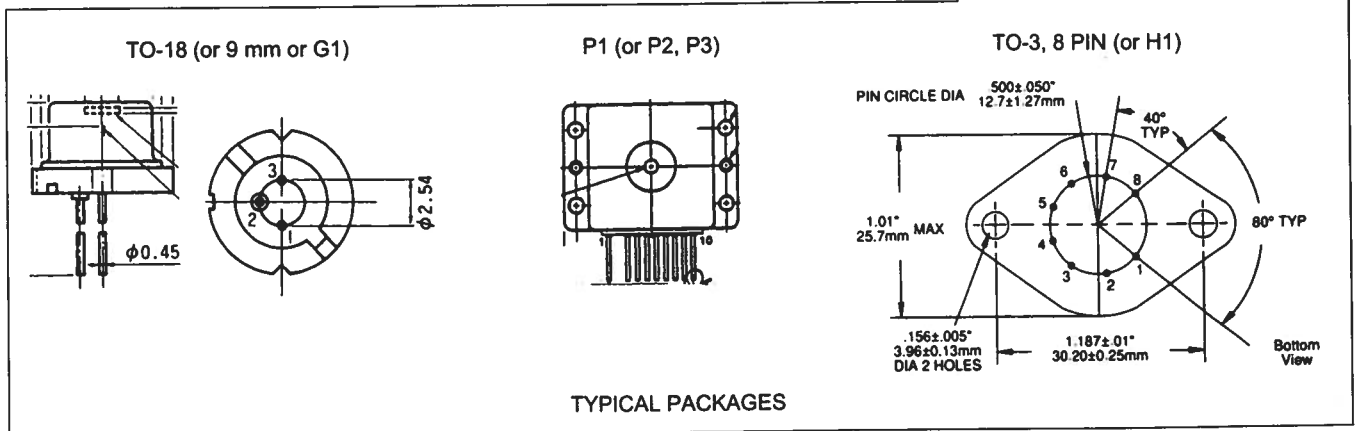
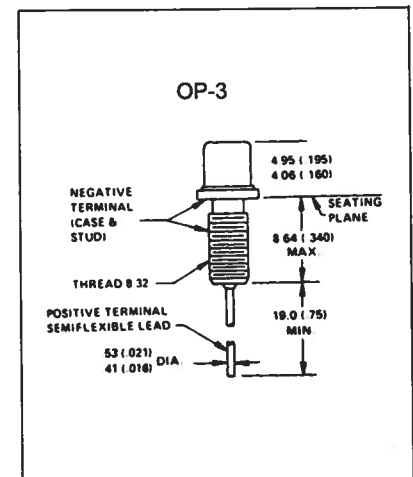


Fig. 4 - AVX-S3 input assembly (for OP-3 package)



USED DIODE BIAS INSERTION UNITS (WITH DIODE SOCKETS)

Walter Chudobiak

From: Avtech Sales
Sent: Monday, February 19, 2001 9:41 AM
To: 'd.cooper@utoronto.ca'
Subject: RE: avtech products

February 19, 2001

Dear David,

- 1) Your pricing for the -ED option for the AVX-D Series is correct.
- 2) The older diode package will do just fine. We need the package to insure that we have all the mechanical details such as the shape (round or flat) and dimensions or diameter of the pins. We can provide access to all the remaining pins via a 9 pin D connector on the side of the AVX-S1 chassis.

We are pleased to re-quote as follows:

Quote No: 10269
 Model Designation: AVX-S1-UTB
 Basic Specifications: As per Fig. page 75 but for your butterfly package and maximum input increased to 40 Volts. Access to the control pins is provided via a 9 pin D-connector on the side of the AVX-S1

chassis.

Price: \$898.00 US, FOB Destination
 Delivery: 60-90 days, after receipt of

order.

This price includes our standard 5% academic discount.

- 3) Thank you for your interest in our products. Please contact me again if you require any additional information.

Regards,

Dr. Michael Chudobiak
VP, New Product Development

> -----Original Message-----

> From: d.cooper@utoronto.ca [mailto:d.cooper@utoronto.ca]
 > Sent: Thursday, February 15, 2001 4:46 PM
 > To: Avtech Sales
 > Subject: RE: avtech products

>
>

> Thank you for the message. I've checked our status and we
 > will be going
 > ahead with the order for the equipment you quoted us on. I
 > forgot though
 > to ask for the -ED option for the AVX-D series. From your web
 > page though,
 > I'll assume that the price is 372-5% ~ = 353, so there is no need to
 > requote since it is a small amount.
 > About the AVX-S1-UT1, what additional information do
 > you need for

July 25/2001