



**AVTECH ELECTROSYSTEMS LTD.**

NANOSECOND WAVEFORM ELECTRONICS  
SINCE 1975

□ P.O. BOX 265  
OGDENSBURG, NY  
U.S.A. 13669-0265  
TEL: (315) 472-5270  
FAX: (613) 226-2802

TEL: 1-800-265-6681  
FAX: 1-800-561-1970  
U.S.A. & CANADA

e-mail: info@avtechpulse.com

☒ BOX 5120 STN. F  
OTTAWA, ONTARIO  
CANADA K2C 3H4  
TEL: (613) 226-5772  
FAX: (613) 226-2802

*May 95  
use this set for  
all AVX-SRB's  
as per Dr. C.*

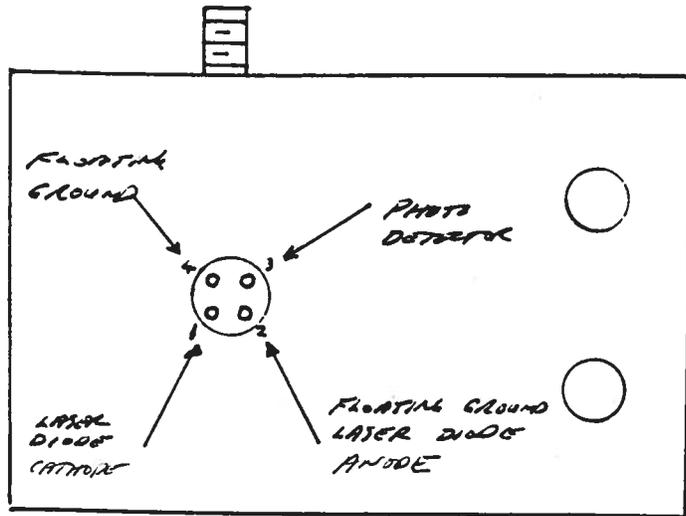
INSTRUCTIONS

MODEL AVX-SRB BIAS MODULATION HEADS

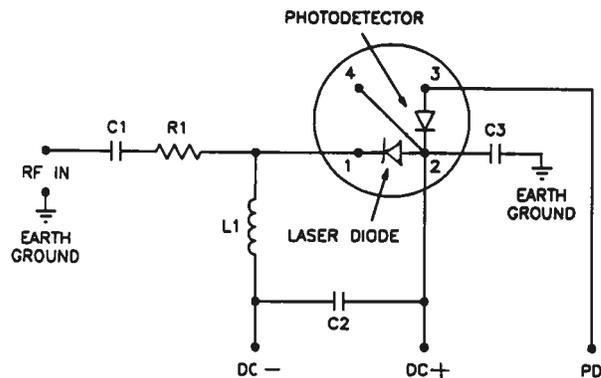
S.N. :

### 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 or liability assumed by Avtech with respect to this product and no other warranty or guarantee is either expressed or implied.

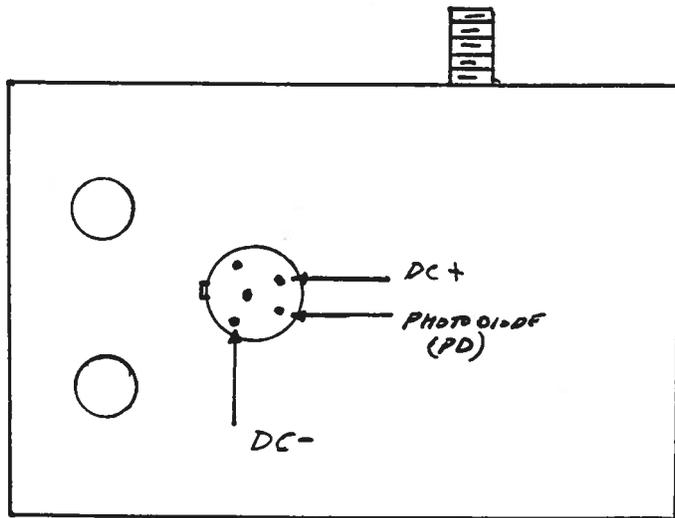


AVX - SRB PIN CONNECTIONS (TYPE 1)  
 (LASER DIODE PIN SOCKET)



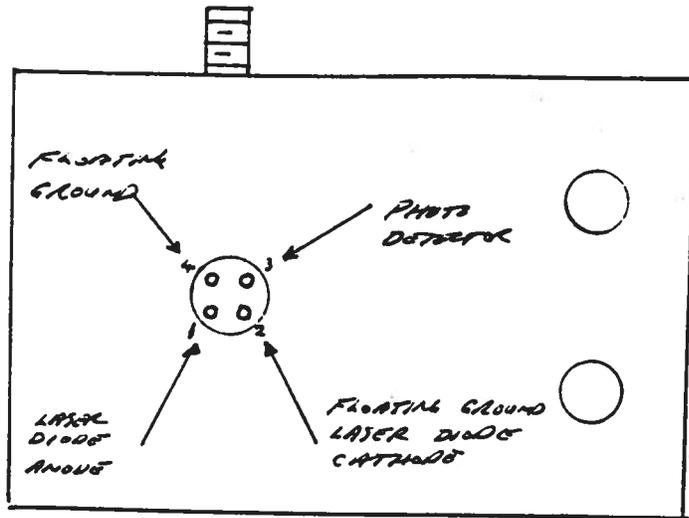
TYPE 1 LASER DIODE PACKAGE SHOWN

AVX-SRB FUNCTIONAL EQUIVALENT CIRCUIT



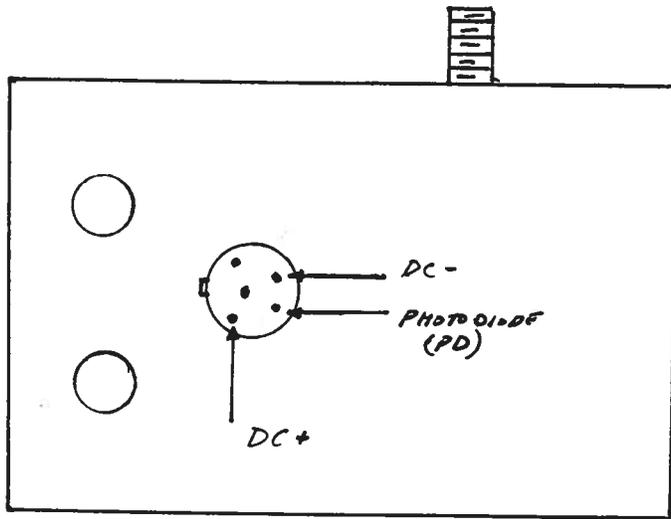
AX-SRB PIN CONNECTIONS (TYPE 1)  
(DC BIAS + PHOTODIODE)

MATES TO SWITCHCRAFT TYPE  
TASM CONNECTOR. FOR SEASPARC  
OPTICS DRIVER, USE BLUE  
CABLE (PART NO AE-9251).



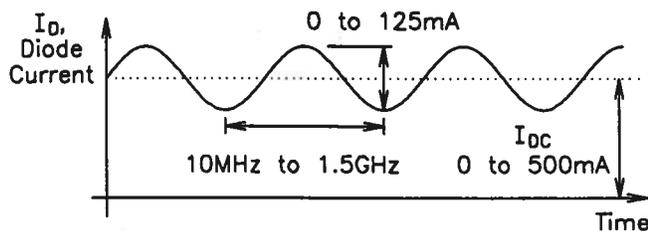
AVX - SRB PIN CONNECTIONS (TYPE 2)  
 (LASER DIODE PIN SOCKET)

SEE FIG 2 OF AVX-SR DATA SHEET.



AX-SRB PIN CONNECTIONS (TYPE 2)  
(DC BIAS + PHOTO DIODE)

SEE FIG 2 AX-SRB DATA SHEET.  
MATES TO SWITCHCRAFT TYPE  
TASM CONNECTOR.



The AVX-SR series of bias-T modulation heads is designed to be used with the Seastar Optics Inc. LD-2000 and LD-2310 low drift precision DC current laser diode drivers. They are used to combine the DC output of the laser diode driver with an RF modulation signal (10 MHz to 1.5 GHz), to drive 3-pin and 4-pin laser diode packages, which insert into a high quality socket on the AVX-SR unit. (The laser diodes are not supplied with the AVX-SR series).

Two models are offered, the AVX-SRA and the AVX-SRB. The AVX-SRA is identical to the AC-9603 modulation head previously available from Seastar Optics. The AVX-SRB is a new improved version, and is recommended for new designs.

The functional equivalent circuit of the AVX-SRA is shown in Figure 1. The input series blocking capacitor, C1, presents a low impedance to RF signals, while the shunt inductor, L1, presents a high impedance to the RF signals but an extremely low impedance to the DC input. This allows the DC and the RF components to be added together without interfering with each other. The series resistor, R1, is selected to ensure that the impedance at the RF IN port is approximately 50 Ohms. Both the RF signal and the DC signal are returned to earth ground. This is important to note, since the LD-2000 and LD-2310 are "floating" laser diode drivers, that is the ground reference in the instrument is not the same as earth ground, and if they are connected (for instance, by connecting a ground-shielded BNC cable to the instrument's modulation input) the potential across the controlled current source will fall to zero Volts, and the potential across the laser diode will rise to 12V, possibly damaging the diode.

Model AVX-SRB avoids this possible problem entirely. The functional equivalent circuit is shown in Figure 2. By adding capacitor C3, the DC inputs are completely isolated from earth ground, so they are free to "float" with respect to earth ground. RF performance is not affected, since C3 acts as a short circuit at RF frequencies, and as an open circuit at DC.

The AVX-SRA will accept three standard 4-pin diode configurations, Types 1, 2, and 3, as shown in Figure 3. The pinout diagrams are depicted as when looking at the end of the AVX-SR's laser diode connector. The laser diode connector is a brass tube that protrudes from the AVX-SR body, with four miniature pin sockets on the end.

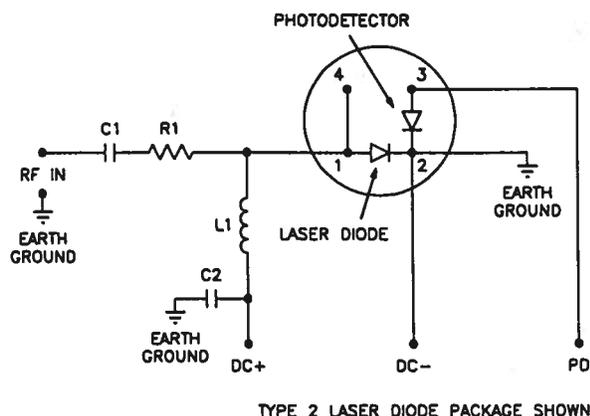
- Compatible with Seastar Optics and other Laser Diode Drivers
- Combines DC bias current with RF modulation signals
- DC bias currents to 500 mA
- RF bandwidth of 10 MHz to 1.5 GHz
- RF currents to 125 mA, peak-to-peak
- RF power of 20 dBm, 100 mW
- 50 Ohm RF input impedance

The view is the same as the laser diode's window side, not its pin or bottom side. The AVX-SRB has slightly different internal connections and will accept four standard pinouts, Types 1, 2, 3, and 5, as illustrated in Figure 3. Three-pin diodes can also be used, simply by avoiding pin four of the socket assembly. For the different pinout types, different cables must be used to connect the modulation head to the Seastar Optics driver. Type 1 diodes require a "Blue Coded" cable, Type 2 diodes require a "Red Coded" cable, and Type 3 and Type 5 diodes require "Black Coded" cables. These cables are available from Seastar Optics. Avtech can supply cables to connect to other makes of drivers.

For both models, a DC current of zero to 500 mA may be applied to the laser diode. The maximum RF input power is 20 dBm (100 mW). This will produce a peak to peak current swing of 125 mA about the DC bias current. The RF input bandwidth extends from 10 MHz to 1.5 GHz. The RF input impedance is approximately 50 Ohms (46 Ohms plus the diode resistance). This is equivalent to a transfer ratio of 20 mAVV.

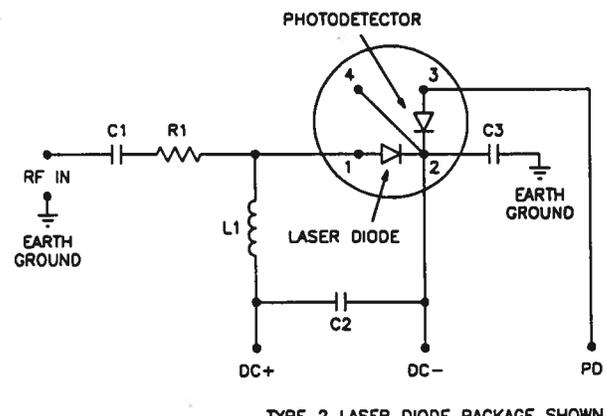
The AVX-SR module is housed in an anodized aluminum chassis, with dimensions 2.2 cm by 5.2 cm by 6.7 cm, from which the diode socket tube protrudes with length 1.2cm and diameter 0.62cm. The AVX-SR series is designed to mate with the Seastar Optics AC-9300 Passive Heat Sink, or the AC-9550A Temperature Head. Figure 4 shows how the components of a Bias-T/Temperature Head System are assembled together with a laser diode. The AVX-SR series is also compatible with laser diode drivers and accessories from other manufacturers.

Model AVX-SRA was originally supplied exclusively to Seastar Optics as a private-label component, with the model number AC-9603. Model AVX-SRA and the new AVX-SRB are now available directly from Avtech (along with the companion AVX-S series for more general purpose and high current applications). Also, see the new Avtech AV-155-C series of DC-coupled laser diode drivers for frequencies in the range of DC to 10 MHz. Call Avtech (1-800-265-6681) for your special requirements and for all of your waveform needs.



TYPE 2 LASER DIODE PACKAGE SHOWN

FIGURE 1 AVX-SRA FUNCTIONAL EQUIVALENT CIRCUIT



TYPE 2 LASER DIODE PACKAGE SHOWN

FIGURE 2 AVX-SRB FUNCTIONAL EQUIVALENT CIRCUIT

Model:	AVX-SRA	AVX-SRB
Maximum DC Bias current:	500 mA	
RF frequency range:	10 MHz - 1.5 GHz	
Maximum RF input power:	20 dBm	
Maximum RF current:	125 mA (peak to peak)	
RF input impedance:	50 Ohms	
Pin 2 grounded:	yes	no
Acceptable diode pinouts (See Fig. 3):	Types 1, 2, and 3	Types 1, 2, 3 and 5
RF input connector:	SMA	
DC bias input connector:	Switchcraft TB5M five-pin connector	
Dimensions, excluding protruding tube:	2.2 cm x 5.2 cm x 6.7 cm	
Dimensions, protruding tube:	Length: 1.2 cm, Diameter: 0.62 cm	
Chassis material:	Black anodized aluminum	
Tube material:	Brass	
Mounting:	See Figure 4	
Pin socket separation:	1.8 mm grid (0.071")	

Diode Configuration	Pinout	Driver Cable	Typical Diodes
Type 1		Blue-coded	Toshiba Hitachi 9mm Sony SDL5311G1  Mitsubishi ML40116R All round Mitsubishi except ML4004
Type 2		Red-coded	Sharp "M" Type Mitsubishi: ML4004 5.6mm Sony Toshiba
Type 3		Black-coded	Mitsubishi: ML7011R (5.6mm)
Type 5		Black-coded	Mitsubishi: ML5704F ML6708E ML7701A ML7761  ML7781 ML8701 ML9701AA ML9702

FIGURE 3 - DIODE CONFIGURATION TABLE

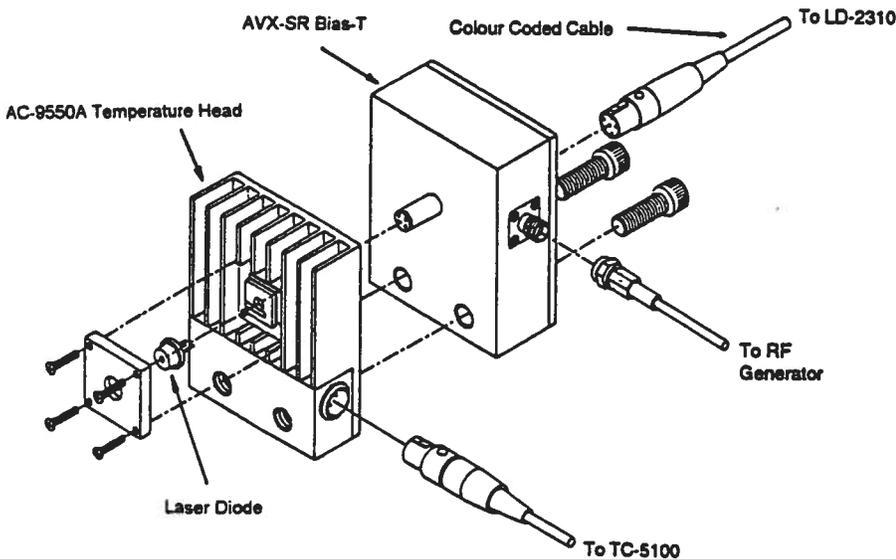


FIGURE 4 - AVX-SR ASSEMBLED WITH AC-9550A TEMPERATURE HEAD

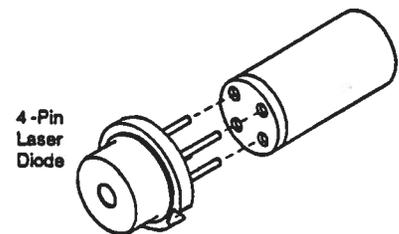
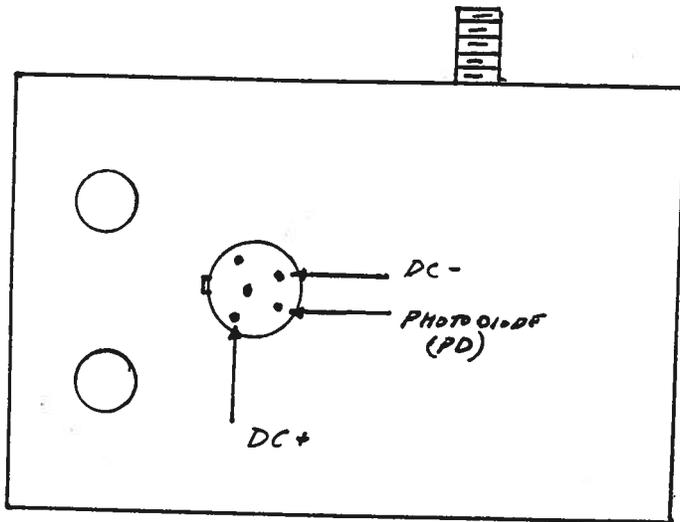


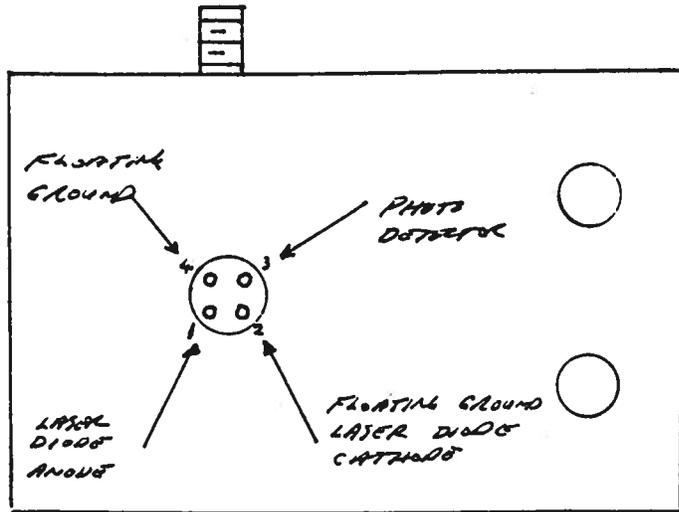
FIGURE 5 - LASER DIODE MOUNTING DETAIL (COOLER NOT SHOWN)



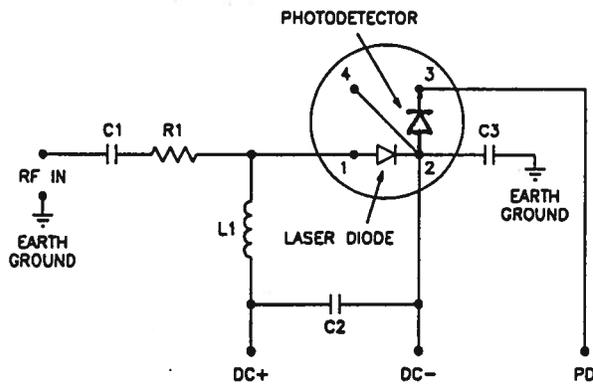
AUX-SRB PIN CONNECTIONS (TYPE 3)  
(DC BIAS + PHOTODIODE)

SEE FIG 2 AUX-SRB DATA SHEET.  
MATES TO SWITCHCRAFT TYPE  
TA5M CONNECTOR.

Note: The voltage on the PD line must be higher than the voltage on the DC- line, in order to properly reverse-bias the photodiode.



AVX-SRB PIN CONNECTIONS (TYPE 3)  
 (LASER DIODE PIN SOCKET)



TYPE 3 LASER DIODE PACKAGE SHOWN

AVX-SRB FUNCTIONAL EQUIVALENT CIRCUIT