INSTRUCTIONS

MODEL AVO-9E-C-TRF PULSE GENERATOR

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 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: 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 DISCONNECTED)

GENERAL OPERATING INSTRUCTIONS

1) The bandwidth capability of components and instruments used to display the pulse generator output signal (attenuators, cables, connectors, etc.) should exceed one gigahertz.

2) The use of 40 db attenuator at the sampling scope vertical input channel will insure a peak input signal to the sampling scope of less than one volt.

3) The TRIG output channel provides a +0.5 V, 10 ns pulse.

4) To obtain a stable output display the PRF and PRF FINE controls on the front panel should be set mid-range while the PRF range switch may be in either range. The front panel TRIG toggle switch should be in the INT position. The front panel DELAY control and the scope triggering controls are then adjusted to obtain a stable output. It is recommended that the DELAY control first be set max counter clockwise and then turned clockwise until a stable display is obtained. The scope may then be used to set the desired PRF by rotating the PRF and PRF FINE controls and by means of the PRF range switch.

5) The output pulse width is controlled by means of the front panel one turn PW control. The control should initially be set maximum counter clockwise and the pulse width adjusted using an oscilloscope.

6) To voltage control the output pulse width, remove the jumper wire between banana plugs A and B on the back panel and apply 0 to +10V to connector B (RIN $\geq$ 10K). (EW option).

7) The output pulse amplitude is controlled by means of the front panel one turn AMP control.

8) To voltage control the output amplitude, remove the jumper wire between banana plugs A and B on the back panel and apply 0 to +10V to connector B (RIN $\geq$ 10K). (EA option).

9) An external clock may be used to control the output PRF of the AVO-9E unit by setting the front panel TRIG toggle switch in the EXT position and applying a 50 ns, or under, TTL level pulse to the TRIG BNC connector input. For operation in this mode, the scope time base must also be triggered by the external clock rather than from the TRIG output.

10) WARNING: Model AVO-9E-C may fail if triggered at a PRF greater than 10.0 MHz or at a duty cycle exceeding 20%.

11) Dual Polarity Option: To invert the output of the AVO-9E unit, connect the IN PORT of the AVX-3 unit to the OUT port of the AVO-9E mainframe. An inverted pulse is then obtained at the OUT port of the AVX-3 unit.

12) The rise and fall time are switched from the high to low range by means of the TR and TF two position switches. (TRF option.)

13) The monitor output (-M) provides a 20 dB attenuated coincident replica of the main output. (option).

14) AVO-9E-C units with a serial number higher than 5600 are protected by an automatic overload protective circuit which controls the front panel overload light. If the unit is overloaded (by operating at an exceedingly high duty cycle or by operating into a short circuit), the protective circuit will turn the output of the instrument OFF and turn the indicator light ON. The light will stay ON (i.e. output OFF) for about 5 seconds after which the instrument will attempt to turn ON (i.e. light OFF) for about 1 second. If the overload condition persists, the instrument will turn OFF again (i.e. light ON) for another 5 seconds. If the overload condition has been removed, the instrument will turn on and resume normal operation. Overload conditions may be removed by:

    1) Reducing PRF (i.e. switch to a lower range)
    2) Reducing pulse width (i.e. switch to a lower range)

15) The AVO-9E-C unit can be converted from 120 to 240V 50-60 Hz operation by adjusting the voltage selector card in the rear panel fused voltage selector-cable connector assembly.

16) For additional assistance:

    Tel: 613-226-5772
    Fax: 613-226-2802

FIG. 2: PULSE GENERATOR TEST ARRANGEMENT
(AVX-S1 MODULE CONNECTED)

GENERAL DESCRIPTION

1) CAUTION: The AVO-9E-C mainframe (S.N. 8594) provides a positive output pulse. To employ S.N. 8594 with the TO 18 laser diode package shown in your fax of July 22, 1998, it is necessary to insert the AVX-3 module in the 50 Ohm line connecting the mainframe to the AVX-S1 output module. Without the AVX-S1 module, the laser diode package must be changed to one where the anode is connected to Pin 1 (of the AVX-S1 module) and the cathode is connected to Pin 2.

2) A general description of the AVX-S1 module is given in the enclosed data sheet.

3) The AVX-S1 module should be connected to the AVO-9E-C mainframe via the supplied 24" RG174 cable. The diode current may be monitored by connecting the MI and MV output ports to the sampling scope via a 20 db attenuator (MI option units only). The output amplitude (V_I, and V_{MV}, Volts) and diode current (I_D, Amp) are related as follows:

$$I_D = 0.2\ (V_{MI} - V_{MV})$$

The laser diode voltage is given by the following:

$$V_D = 10\ (V_{MV})$$

4) The laser diode plugs directly into the socket on the side of the AVX-S1 module.

5) 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.

FIG. 3: FRONT PANEL CONTROLS

FRONT PANEL CONTROLS

(1) ON-OFF Switch. Applies basic prime power to all stages.

(2) PRF Control. PRF RANGE and PRF controls determine output PRF as follows:

	PRF MIN	PRF MAX
Range 1	100 Hz	1 KHz
Range 2	1 KHz	10 KHz
Range 3	10 KHz	100 KHz
Range 4	100 KHz	1 MHz
Range 5	1 MHz	10 MHz

(3) DELAY Control. Controls the relative delay between the reference output pulse provided at the TRIG output (4) and the main output (7). This delay is variable over the range of 0 to at least 100 ns.

(4) TRIG Output. This output precedes the main output (7) and is used to trigger the sampling scope time base. The output is a +0.5V 10 ns (approx.) pulse capable of driving a fifty ohm load.

(5) PW Control. A one turn control which varies the output pulse width.

(6) AMP Control. A one turn control which varies the output pulse amplitude from 0 to max output to a fifty ohm load.

(7) OUT Connector. SMA connector provides output to a fifty ohm load.

(8) EXT-INT Control. With this toggle switch in the INT position, the PRF of the unit is controlled via an internal clock which in turn is controlled by the PRF and PRF FINE controls. With the toggle switch in the EXT position, the unit requires a 50 ns (or less) TTL level pulse applied at the TRIG input in order to trigger the output stages. In addition, in this mode, the scope time base must be triggered by the external trigger source.

(9) TR, TF, HIGH-LOW. Two position switches to set TR (or TF) in HIGH and LOW ranges. (option TRF).

(10) OVERLOAD INDICATOR: AVO-9E-C units with a serial number higher than 5600 are protected by an automatic overload protective circuit which controls the front panel overload light. If the unit is overloaded (by operating at an

exceedingly high duty cycle or by operating into a short circuit), the protective circuit will turn the output of the instrument OFF and turn the indicator light ON. The light will stay ON (i.e. output OFF) for about 5 seconds after which the instrument will attempt to turn ON (i.e. light OFF) for about 1 second. If the overload condition persists, the instrument will turn OFF again (i.e. light ON) for another 5 seconds. If the overload condition has been removed, the instrument will turn on and resume normal operation. Overload conditions may be removed by:

1) Reducing PRF (i.e. switch to a lower range)
2) Reducing pulse width (i.e. switch to a lower range)

FIG. 4: BACK PANEL CONTROLS

BACK PANEL CONTROLS

(1) FUSED CONNECTOR, VOLTAGE SELECTOR. The detachable power cord is connected at this point. In addition, the removable cord is adjusted to select the desired input operating voltage. The unit also contains the main power fuse (0.25 A SB).

(2) 1.0A SB. Fuse which protects the output stage if the output duty cycle rating is exceeded.

(3) EA. To voltage control the output amplitude, set the switch in the EXT position and apply 0 to +10 Volts between terminal A and ground (R_{IN} > 10K). (option).

(4) EW. To voltage control the output pulse width, set the switch in the EXT position and apply 0 to +10 Volts between terminal A and ground (R_{IN} > 10K). (option).

FIG. 5: SYSTEM BLOCK DIAGRAM

SYSTEM DESCRIPTION AND REPAIR PROCEDURE

The AVO-9E-C consists of a pulse generator module (AVO-9E-PG), a clock module (AVO-9E-CL) and a power supply board which supplies +24 Volts (600 mA max) to the pulse generator module. In the event that the unit malfunctions, remove the instrument cover by removing the four Phillips screws on the back panel of the unit. The top cover may then be slid off. Measure the voltage at the +24 V pin of the PG module. If this voltage is substantially less than +24 Volts, unsolder the line connecting the power supply and PG modules and connect 50 ohm 10 W load to the PS output. The voltage across this load should be about +24 V DC. If this voltage is substantially less than 24 volts the PS module is defective and should be repaired or replaced. If the voltage across the resistor is near 24 volts, then the PG module should be replaced or repaired. The sealed PG module must be returned to Avtech for repair (or replacement). The clock module provides a 20 ns TTL level trigger pulse at pin M to trigger the PG module and a 20 ns 0.5 V sync pulse at pin S to trigger the sampling scope display device. The output at pin S precedes the output at pin M by 0 to 100 ns depending on the DELAY control setting. With the INT-EXT switch in the EXT position, the clock module is disconnected from the PG module. The clock module is functioning properly if:

a) 20 ns outputs are observed at pins M and S.

b) The PRF of the outputs can be varied over the range of 10 Hz to 10 MHz using the PRF, PRF FINE and PRF RANGE controls.

c) The relative delay between the pin M and S outputs can be varied by at least 100 ns by the DELAY control.

The sealed clock module must be returned to Avtech for repair or replacement if the above conditions are not observed.

PERFORMANCE CHECK SHEET