



# AVTECH ELECTROSYSTEMS LTD.

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SINCE 1975

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## INSTRUCTIONS

MODEL AVR-E2-C-ISA 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 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

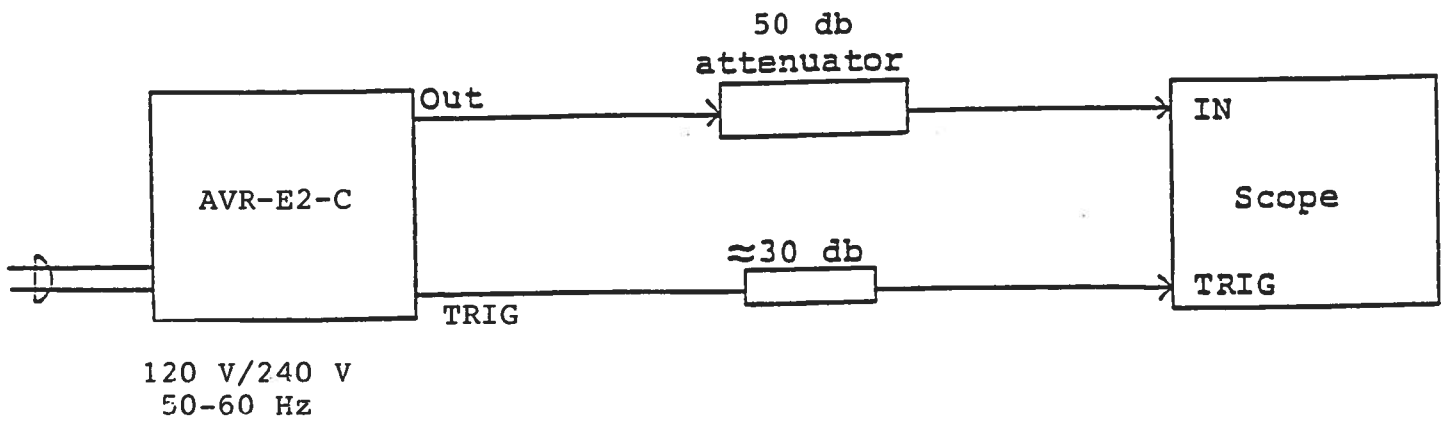
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## TABLE OF CONTENTS

WARRANTY .....	2
TABLE OF CONTENTS .....	3
FIG. 1: PULSE GENERATOR TEST ARRANGEMENT .....	4
GENERAL OPERATING INSTRUCTIONS .....	5
Fig. 2: FRONT PANEL CONTROLS .....	7
FRONT PANEL CONTROLS .....	8
Fig. 3 BACK PANEL CONTROLS.....	10
BACK PANEL CONTROLS.....	11
Fig. 4: SYSTEM BLOCK DIAGRAM.....	12
Fig. 5: AVR-E1W-C-P-OT (GGB MOD).....	13
SYSTEM DESCRIPTION AND REPAIR PROCEDURE .....	14
PERFORMANCE CHECK SHEET .....	15

FIG. 1: PULSE GENERATOR TEST ARRANGEMENT

## 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 2 GHz.
- 2) The use of 50 dB attenuator at the scope vertical input channel will insure a peak input signal to the scope of less than one Volt (necessary only if sampling scope used). If a high impedance real time scope is used, the pulse generator should be terminated using a shunt 50 Ohm resistor.
- 3) The TRIG output channel provides TTL level signals. To avoid overdriving the TRIG input channel of some scopes, a 30 dB attenuator should be placed at the input to the scope trigger channel. The TRIG output precedes the main output when the front panel ADVANCE-DELAY switch is in the ADVANCE position. The TRIG output lags the main output when the switch is in the DELAY position.
- 4) To obtain a stable output display the PW and PRF controls on the front panel should be set mid range. The front panel TRIG toggle switch should be in the INT position. The DELAY controls and the scope triggering controls are then adjusted to obtain a stable output. The scope may then be used to set the desired PRF by rotating the PRF controls.
- 5) The output pulse width is controlled by means of the front panel one turn PW control. To voltage control the pulse width set the rear panel switch in the EXT position and apply 0 to +10 Volts between terminal A and ground ( $R_{IN} \geq 10K$ ). (option).
- 6) The output pulse amplitude is controlled by means of the front panel one turn AMP control. To voltage control the output, set the rear panel switch in the EXT position and apply 0 to +10 Volts between terminal A and ground ( $R_{IN} \geq 10K$ ). (option).
- 7) An external clock may be used to control the output PRF of the AVR unit by setting the front panel TRIG toggle switch in the EXT position and applying a 50 ns (or wider) TTL level pulse to the TRIG BNC connector input.
- 8) The -ISA suffix denotes the ability to output a double pulse when the front panel single pulse – double pulse is in the double pulse position. The separation between the leading edges of the two output pulses is controlled by the one turn separation control. Note that as the pulse width is varied it will also change the pulse separation.

- 9) AVR 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)
  - 3) Removing output load short circuit (if any)

Note that the light may illuminate when the prime power is applied. The light will extinguish after a few seconds and the unit will then operate normally.

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

- 11) For additional assistance:

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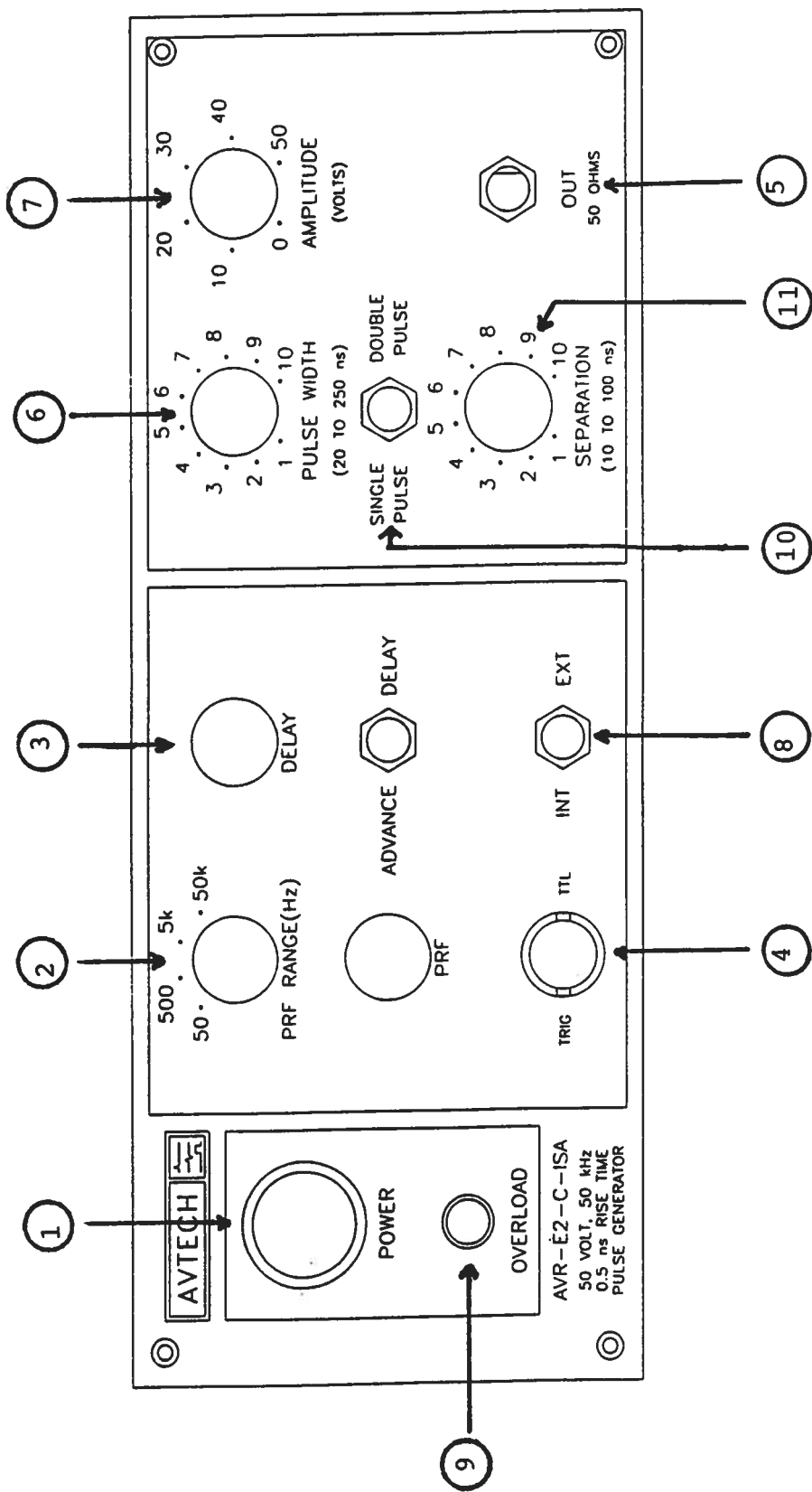


Fig. 2: FRONT PANEL CONTROLS

## FRONT PANEL CONTROLS

- (1) ON/OFF Switch. Applies basic prime power to all stages.
- (2) PRF Control. Varies PRF as follows:

	MIN	MAX
Range 1	5 Hz	50 Hz
Range 2	50 Hz	500 Hz
Range 3	500 Hz	5 kHz
Range 4	5 kHz	50 kHz

The operating PRF should be set using a scope.

- (3) DELAY Control. Controls the relative delay between the reference output pulse provided at the TRIG output (4) and the main output (5). This delay is variable over the range of 0 to about 200 ns. The TRIG output precedes the main output when the ADVANCE-DELAY switch is in the ADVANCE position and lags when the switch is in the DELAY position.
- (4) TRIG Output. This output is used to trigger the scope time base. The output is a TTL level 100 ns (approx.) pulse capable of driving a 50 Ohm load.
- (5) OUT Connector. SMA connector provides output to a 50 Ohm load.
- (6) PW Control. A one-turn control, which varies the output, pulse width from 20 ns to 200 us.
- (7) AMP Control. A one turn control which varies the output pulse amplitude to a 50 Ohm load.
- (8) EXT-INT Control. With this toggle switch in the INT position, the PRF of the AVR unit is controlled via an internal clock, which in turn is controlled by the PRF controls. With the toggle switch in the EXT position, the AVR unit requires a 50 ns (or wider) 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.



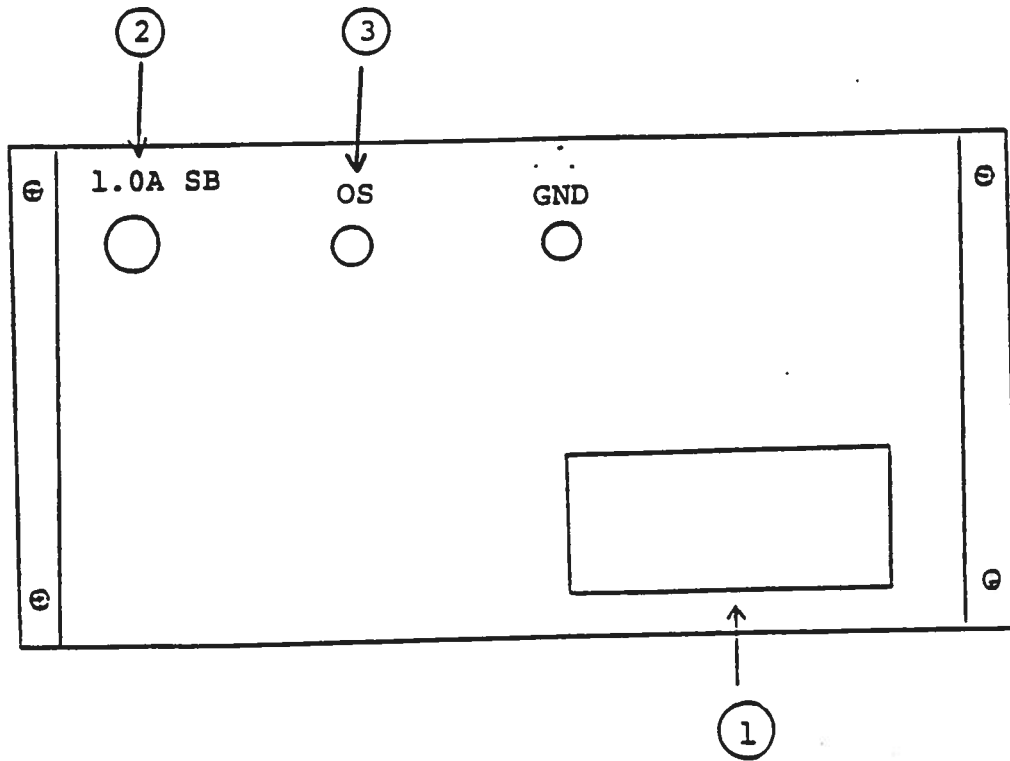
- (9) OVERLOAD. AVR units with a serial number higher than 5600 are protected by an automatic overload protective circuit which controls the front panel overload light. If the unit is overloaded (by operating at an exceedingly high duty cycle or by operating into a short circuit), the protective circuit 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)
3. Removing output load short circuit (if any)

Note that the light may illuminate when the prime power is applied. The light will extinguish after a few seconds and the unit will then operate normally.

- (10) Single Pulse – Double Pulse The –ISA suffix denotes the ability to output a double pulse when the front panel single pulse – double pulse is in the double pulse position. The separation between the leading edges of the two output pulses is controlled by the one turn separation control. Note that as the pulse width is varied it will also change the pulse separation.
- (11) Separation One turn control varies the separation between the leading edges of the output pulses (when in the double pulse mode).

Fig. 3 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 (0.5A SB).
- (2) 1.0A SB. Fuse, which protects the output stage if the output duty cycle rating, is exceeded.
- (3) DC Offset. To DC offset the output pulse at the output, connect a DC power supply set to the required DC offset value to the OS terminals ( $V_{MAX} \pm 50$  Volts,  $I_{MAX} \pm 100$  mA). (option).

Fig. 4: SYSTEM BLOCK DIAGRAM

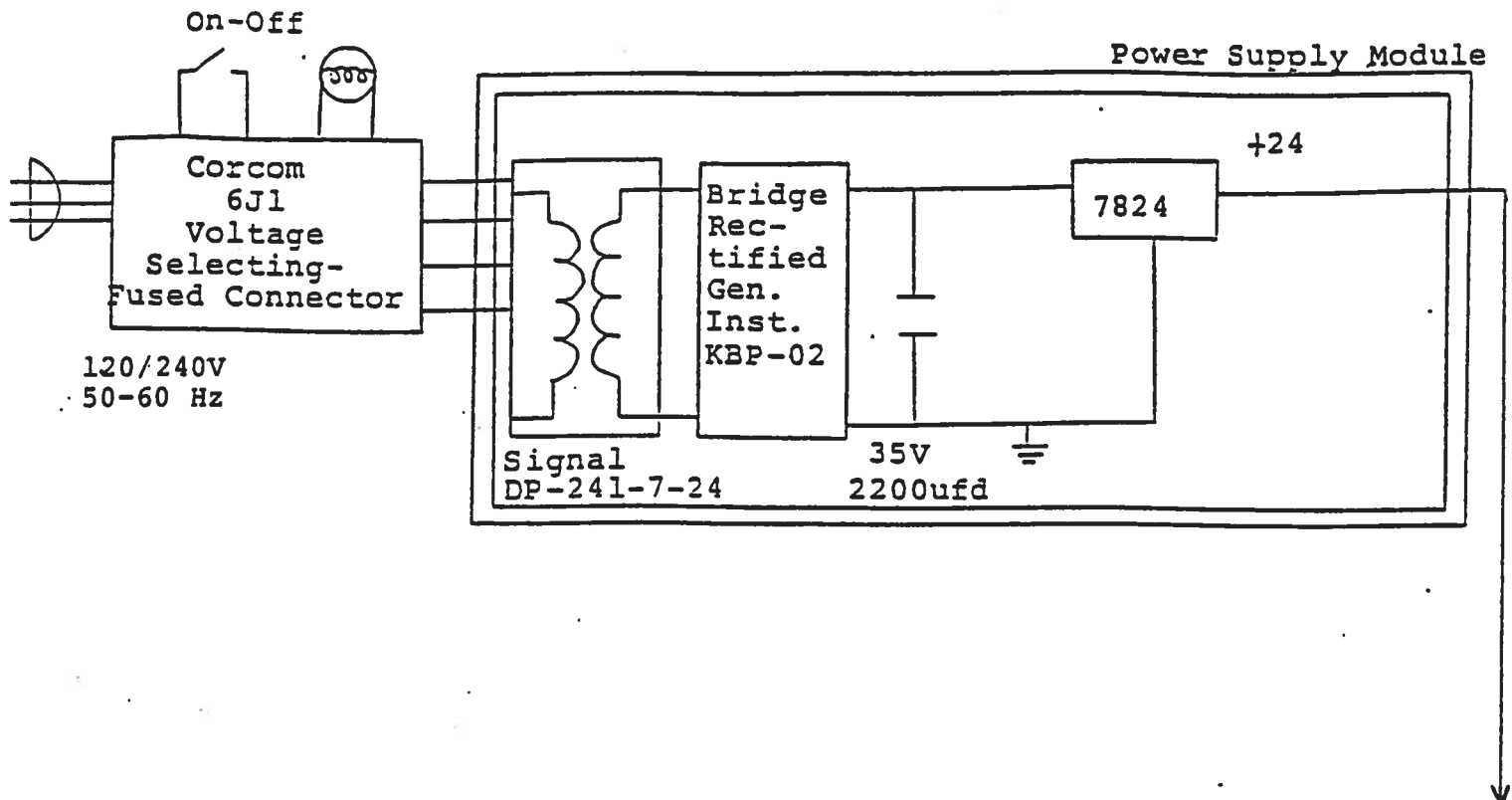
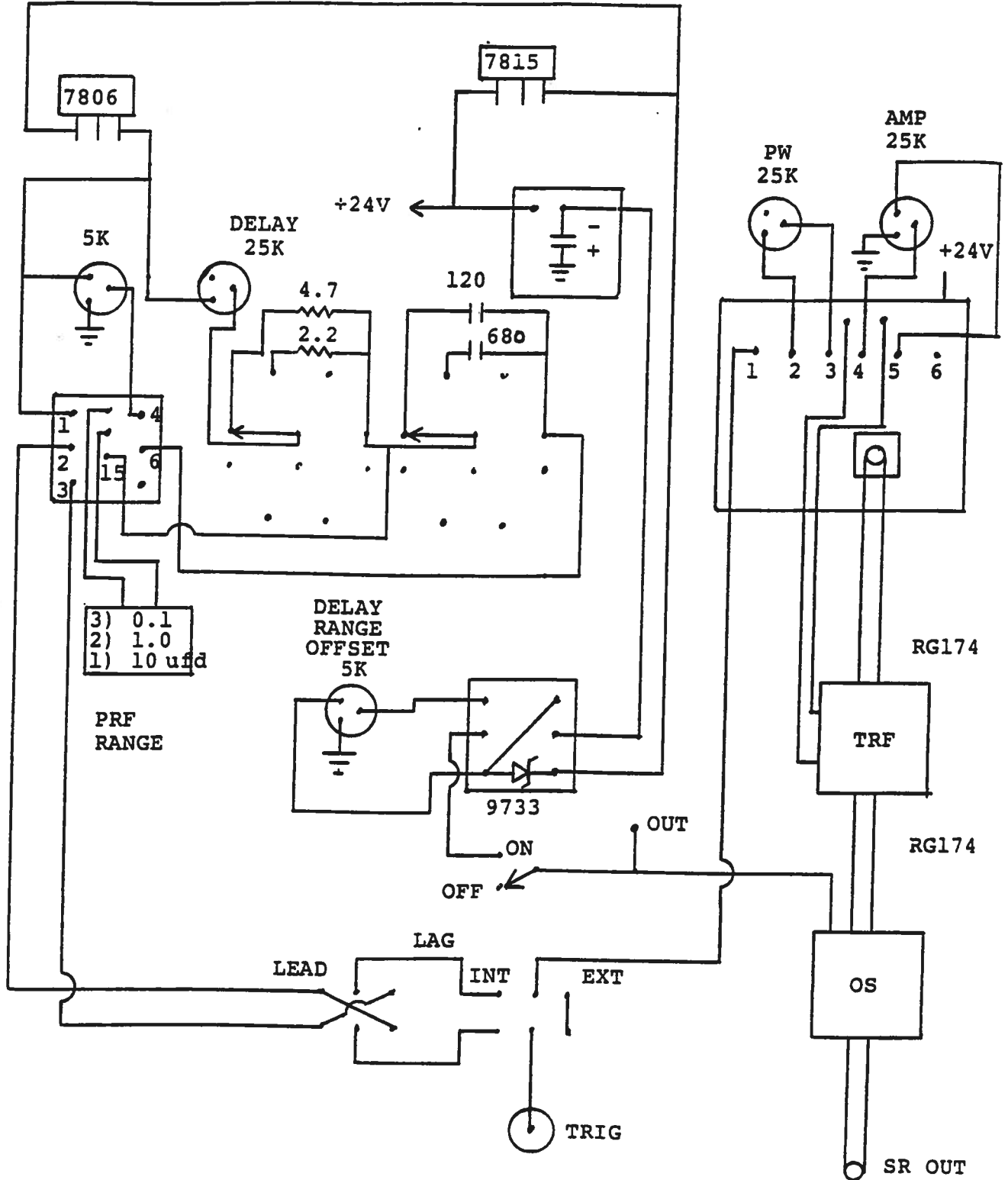


Fig. 5: AVR-E1W-C-P-OT (GGB MOD)



## SYSTEM DESCRIPTION AND REPAIR PROCEDURE

The AVR-E2-C consists of the following basic modules:

1. AVR-E2-PG pulse generator module
2. AVR-E2-CL clock module
3. +24V power supply board
4. Overload module

The modules are interconnected as shown in Fig. 4.

The clock module controls the output PRF and the relative delay between the main output and the TRIG output. The PG pulse generator modules generate the output pulse. In the event of an instrument malfunction, it is most likely that the rear panel 1.0A SB fuse may have failed due to an output short circuit condition or to a high duty cycle condition. If the fuse is not blown, then the four Phillips screws on the back panel should be removed. The top cover may then be slid off and operation of the clock and power supply modules should be checked. The clock module is functioning properly if:

- a) TTL level outputs are observed at Pins 2 and 3.
- b) The PRF of the outputs can be varied over the range of 10 Hz to 10 kHz using the PRF controls.
- c) The relative delay between the Pin 2 and 3 outputs can be varied by at least 5 us by the DELAY controls.

The sealed clock module must be returned to Avtech for repair or replacement if the above conditions are not observed. The power supply board generates +24V DC to power the other modules. If the voltage is less than +24V, turn off the prime power and unsolder the lead from the 7824 regulator chip on the power supply board. Solder a 100 Ohm 5 Watt resistor to the 7824 output to ground and turn on the prime power. A voltage of +24 Volts should be read. If the voltage is less then the power supply board is defective and should be repaired or replaced.



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Phone:	<u>650-969-4100 Ext. 123</u>	No. of pages:	<u>1</u>
Subject:	<u>AVR-E2-C</u>	C.C.	<u></u>

This will confirm that the standard AVR-E2-C (for which you have placed an order) may be externally triggered by two TTL pulses separated by 40 ns to produce a 40 ns wide output pulse pair. In addition, we would add an option to your unit which would introduce an internally generated double pulse control. The pulse separation would be variable from 10 ns to 100 ns (via a one turn control). To specify this additional feature, add the suffix -ISA to Model number and add \$598.00 US to the price.

Regards,

Dr. Walter Chudobiak  
Chief Engineer

March 3/99 - Converted.