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INSTRUCTIONS

MODEL AVO-7-C-PN-EA-EW-RD1 PULSE GENERATOR

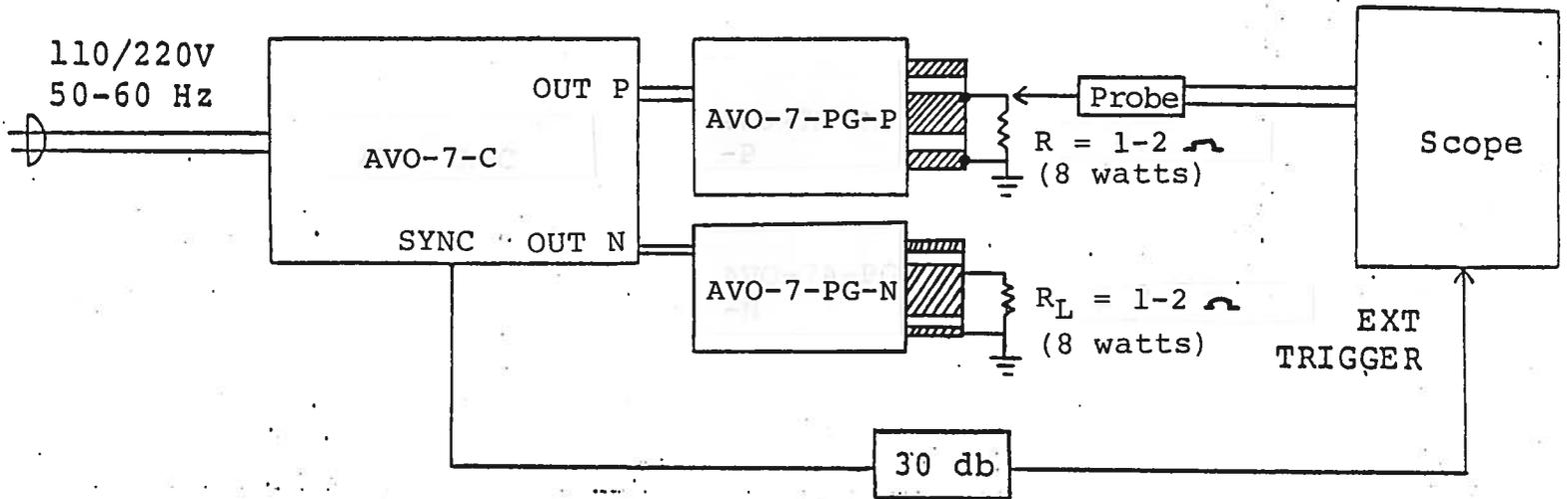
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WARRANTY

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.

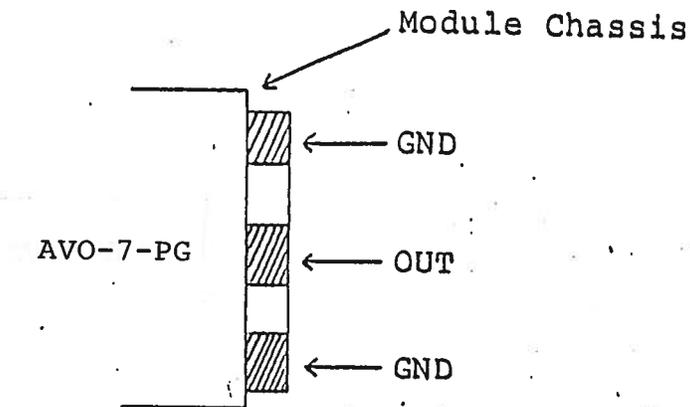
Fig. 1

PULSE GENERATOR TEST ARRANGEMENT

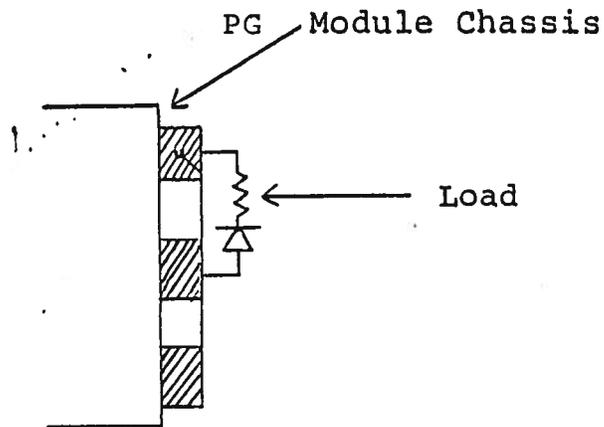


GENERAL OPERATING INSTRUCTIONS

- 1) The equipment should be connected in the general fashion shown above.
- 2) The sync output channel provides TTL level signals. To avoid overdriving the TRIG input channel of some sampling scopes, a 30 db attenuator should be placed at the input to the sampling scope trigger channel.
- 3) The desired output polarity is selected by means of the front panel POLARITY switch. With the POLARITY switch in the P position, the negative output pulse generator is rendered inactive. Likewise, with the POLARITY switch in the N position, the positive pulse generator is rendered inactive.
- 4) The output terminals of the pulse generator module consists of a short length of microstrip transmission line protruding from the module chassis. The OUT terminal is the center conductor which is bounded on both sides by the ground plane (see below):



The load should be connected between the OUT and GND terminals using very short leads ($\ll 0.5$ cm). The voltage across the load may be monitored by means of a high impedance scope probe. The current may be monitored using a current probe or a current transformer arrangement.



Notes:

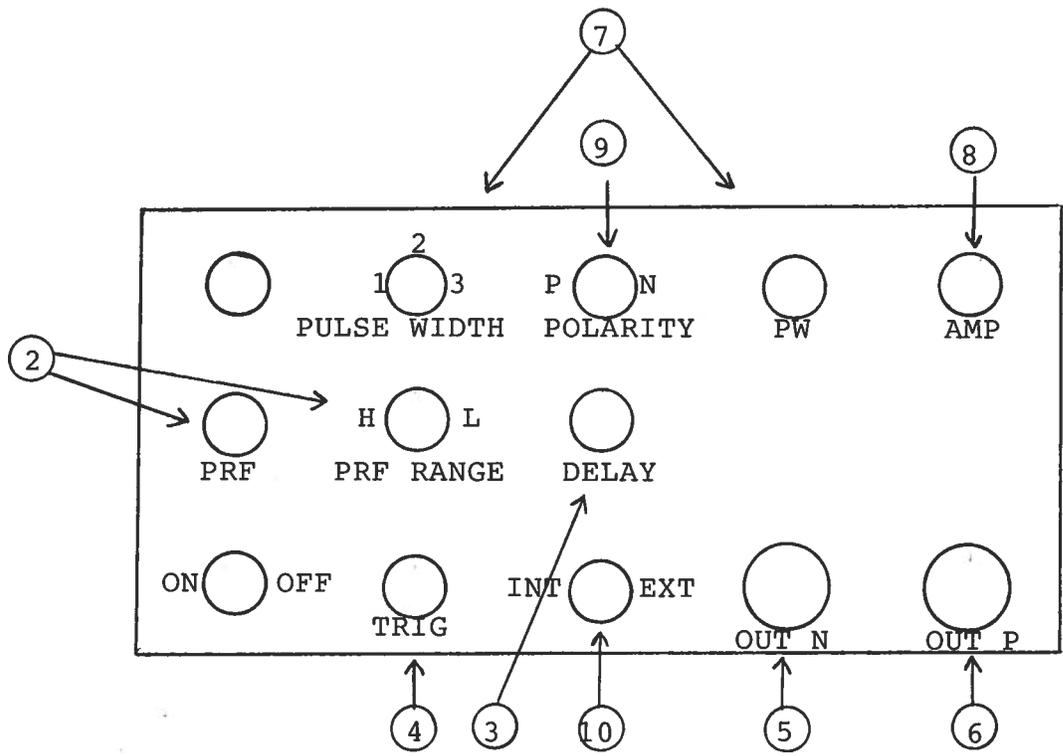
- 1) At max duty cycle and amplitude the load must dissipate 8 watts.
- 2) Reverse diode load for negative pulse generator.
- 3) Max load voltage must not exceed 20 volts.

Take care to insure that during soldering the OUT conductor is not shorted to the chassis. Also, use minimal heat when soldering.

- 5) To obtain a stable display, the PRF range switch should be set in the LOW position and the PRF control set max clockwise. The PW RANGE switch should be in Range 1 and the PW control set max counterclockwise. 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, PW and AMP. CAUTION: The unit may fail if the output duty cycle exceeds 1%. Consequently, at 50 Hz the output PW must be 200 usec or less while at 5 KHz, the PW must be less than 2 usec.
- 6) The output pulse widths for the positive and negative outputs are controlled by means of the front panel one turn PW control and 3 position PW RANGE switch.
- 7) The output pulse amplitudes for the positive and negative outputs are controlled by means of the front panel one turn AMP P and AMP N controls. The pulse generator will supply up to 20 amperes to a load voltage as high as 20 volts. The output current can be controlled by means of the AMP control and by controlling the series load resistance. A net series resistance of about 1 to 2 ohm is recommended. This may be fabricated from paralleling multiple 0.5 watt carbon composition resistors to yield a 1 to 2 ohm (approx.) 8 watt load.
- 8) 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 ($R_{IN} \geq 10K$). (option).
- 9) 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 ($R_{IN} \geq 10K$). (option).
- 10) An external clock may be used to control the output PRF of the AVO unit by setting the front panel TRIG toggle switch in the EXT position and applying a 0.2 usec (approx.) 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 SYNC output.

Fig. 2

FRONT PANEL CONTROLS



- (1) ON-OFF Switch. Applies basic prime power to all stages.
- (2) PRF Control. Varies PRF from 2 Hz to 5 KHz as follows:
 - LOW: 2 Hz to 50 Hz
 - HIGH: 20 Hz to 5 KHz
- (3) DELAY Control. Controls the relative delay between the reference output pulse provided at the TRIG output (4) and the main outputs (5) and (6). This delay is variable over the range of 0 to about 1.0 usec.
- (4) TRIG Output. This output precedes the main output (5) and (6) and is used to trigger the scope time base. The output is a TTL level 100 nsec (approx.) pulse capable of driving a fifty ohm load. The external trigger signal (0.2 usec, TTL) is applied at this input when the EXT-INT toggle switch is in the EXT position.
- (5) OUT N Connector. A multi pin connector which attaches the 2 foot cable from the negative pulse generator module to the main frame.
- (6) OUT P Connector. A multi pin connector which attaches the 2 foot cable from the positive pulse generator module to the main frame.
- (7) PW Control. A one turn control and 3 position range switch which varies the positive output pulse width from 0.2 usec to 200 usec. The minimum and maximum PW for each range and the corresponding maximum PRF are as follows. Note that the unit may fail if operated at duty cycles exceeding the above.

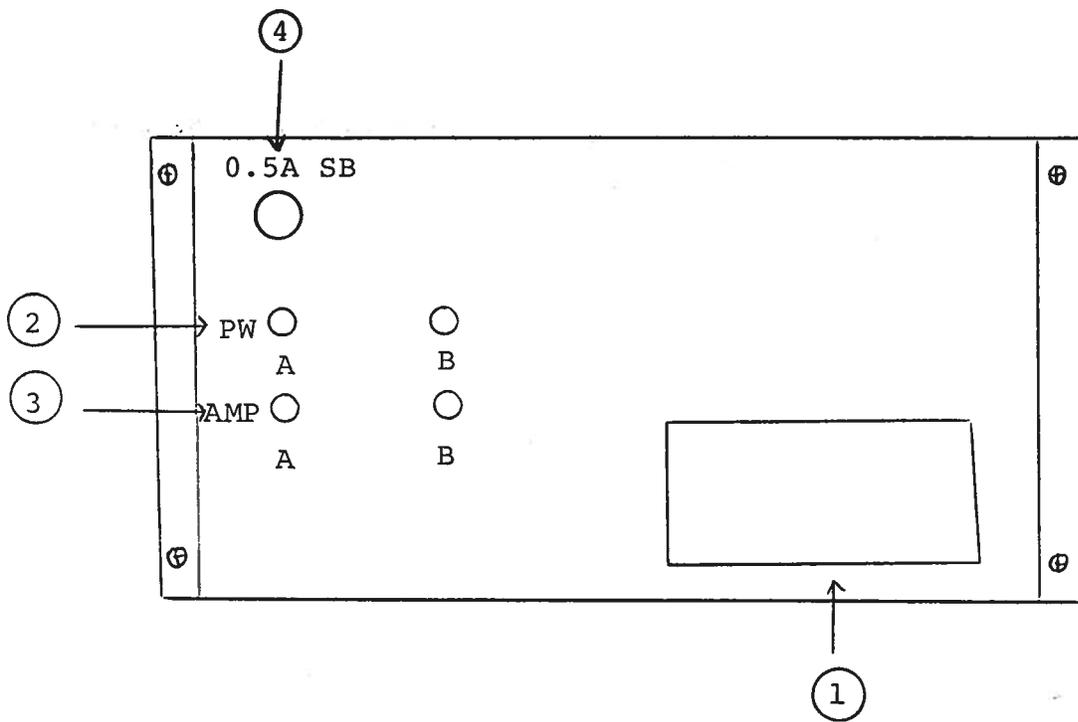
	PW min	PW max
Range 1	0.2 usec PRF max 5 KHz	2.0 usec PRF max 5 KHz
Range 2	2.0 usec PRF max 5 KHz	20 usec PRF max 500 Hz
Range 3	20 usec PRF max 500 Hz	200 usec PRF max 50 Hz

- (8) AMP Control. A one turn control which varies the positive output pulse amplitude from 0 to 20V to a 1 to 2 ohm load.
- (9) POLARITY Control. With the switch in the P position, the negative output pulse generator is rendered inactive. With the switch in the N position, the positive output pulse generator is rendered inactive.

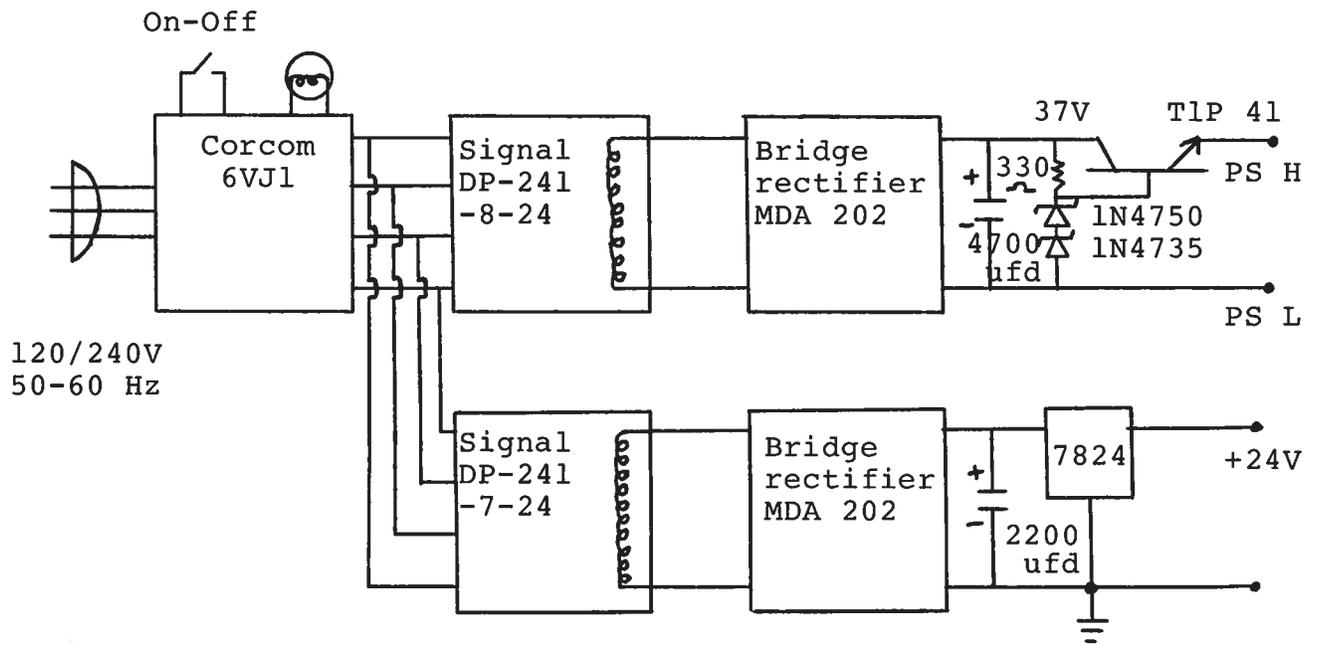
(10) EXT-INT Control. With this toggle switch in the INT position, the PRF of the AVO unit is controlled via an internal clock which in turn is controlled by the PRF and PRF FINE controls. With the toggle switch in the EXT position, the AVO unit requires a 0.2 usec TTL level pulse applied at the TRIG 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.

Fig. 3

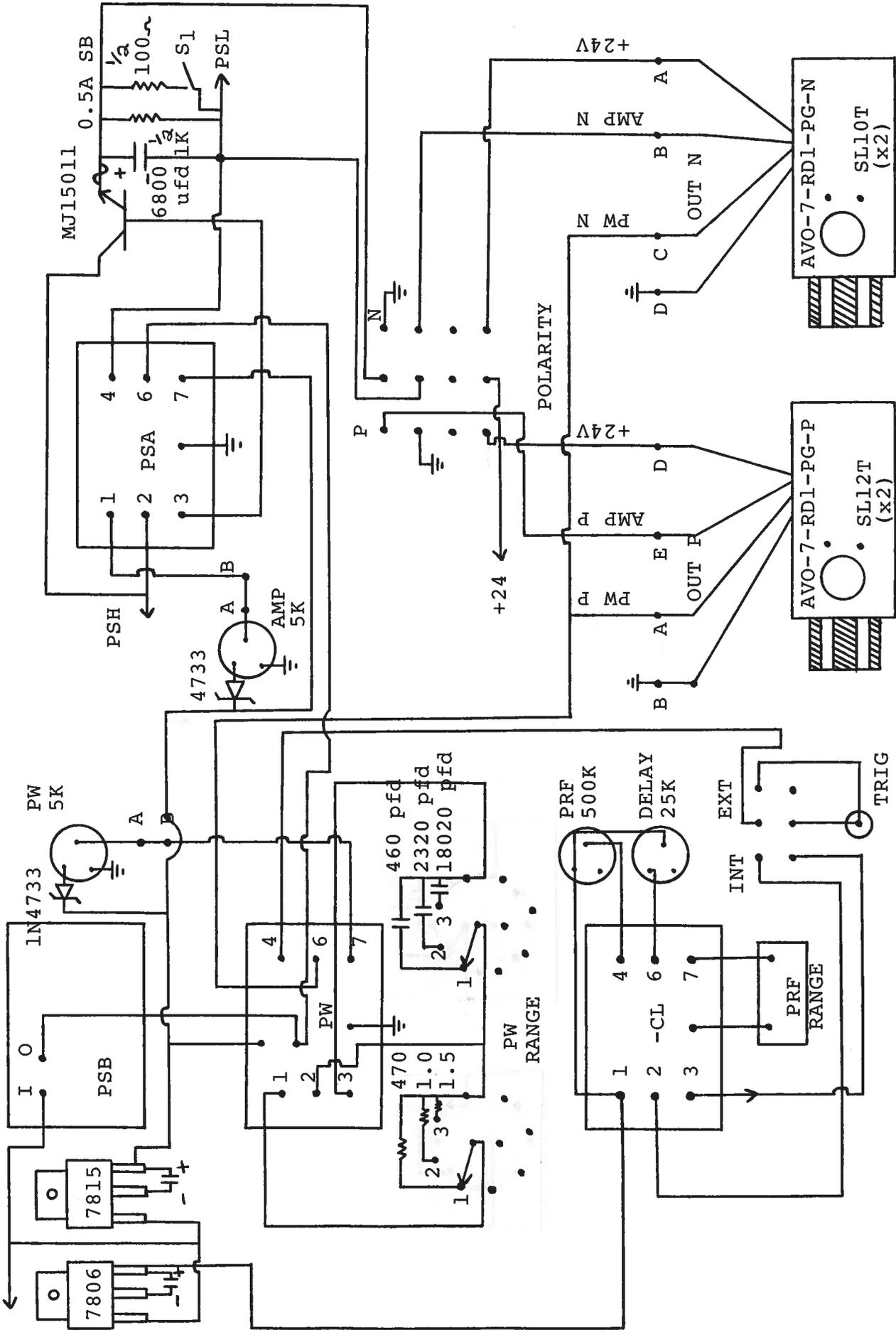
BACK PANEL CONTROLS



- (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.
- (2) To voltage control the output pulse width, remove the jumper wire between banana plugs A and B and apply 0 to +10V to connector B ($R_{IN} \gg 10K$).
- (3) To voltage control the output amplitude, remove the jumper wire between banana plugs A and B and apply 0 to +10V to connector B ($R_{IN} \gg 10K$).
- (4) 0.5 SB fuse limits the DC current supplied to the output stage.



AVO-7-EA-EW-C POWER SUPPLY



SYSTEM DESCRIPTION AND REPAIR PROCEDURE

The AVO-7-C unit consists of the following basic modules:

- 1) AVO-7-PG pulse generator modules (positive and negative)
- 2) AVO-7-CL clock module
- 3) AVO-7-PW pulse width control module
- 4) AVO-7-PSA power supply module
- 5) AVO-7-PSB power supply module
- 6) +24V power supply board
- 7) +30V power supply board

The modules are interconnected as shown in Fig. 4.

In the event of an instrument malfunction, it is most likely that either of the rear panel fuses have blown or that some of the output switching elements (SL10T and SL12T) may have failed due to an output short circuit condition or to a high duty cycle condition. The switching elements may be accessed by removing the cover plate on the bottom side of the -PG module. The cover plate is removed by removing the four counter sunk 6-32 Phillips screws. NOTE: First turn off the prime power. The elements may be removed from their sockets by means of a needle nosed pliers after removing the four counter sunk 2-56 Phillips screws which attach the small aluminum heat sinks to the body of the AVO-7-PG module. The SL10T and SL12T are selected VMOS power transistors in a TO 220 packages and may be checked on a curve tracer. If defective, replacement units should be ordered directly from Avtech. When replacing the SL10T and SL12T switching elements, take care to insure that the short lead (of the three leads) is adjacent to the black dot on the chassis. The SL10T and SL12T elements are electrically isolated from the small aluminum heat sinks but are bonded to the heat sinks using WAKEFIELD TYPE 155 HEAT SINK ADHESIVE. If the switching elements are not defective, then the four Phillips screws on the back panel should be removed. The top cover may then be slid off and the operation of the clock and power supply modules checked. The clock module is functioning properly if:

- a) 0.1 usec TTL level outputs are observed at pins 2 and 3.
- b) The PRF of the outputs can be varied over the range of 2 Hz to 5 KHz using the PRF controls.
- c) The relative delay between the pin 2 and 3 outputs can be varied by at least 1 usec by the DELAY control.

The sealed clock module must be returned to Avtech for repair or replacement if the above conditions are not observed. The AVO-7-PSA module supply 0 to +30 volts to the -PG modules as

the AMP control is varied. Replace units if the output does not vary over this range.

The AVO-7-PW module provides an output PW at Pin 6 which controls the output PW of the PG modules from 0.2 to 200 usec. Replace if defective. The AVO-7-PSB module supplies -15V DC to various other modules.

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the AMR control is varied. Replace units if the output does not vary over this range.

The AVD-7-PW module provides an output PW at Pin 6 which controls the output PW of the PB modules from 0.2 to 200 μ sec. Replace if defective. The AVA-7-P28 module supplies 12V DC to various other modules.