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## INSTRUCTIONS

MODEL AVR-4B-PS-PW-P-EXA 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 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

CONFIGURATION 1

(for PW less than 10 msec)

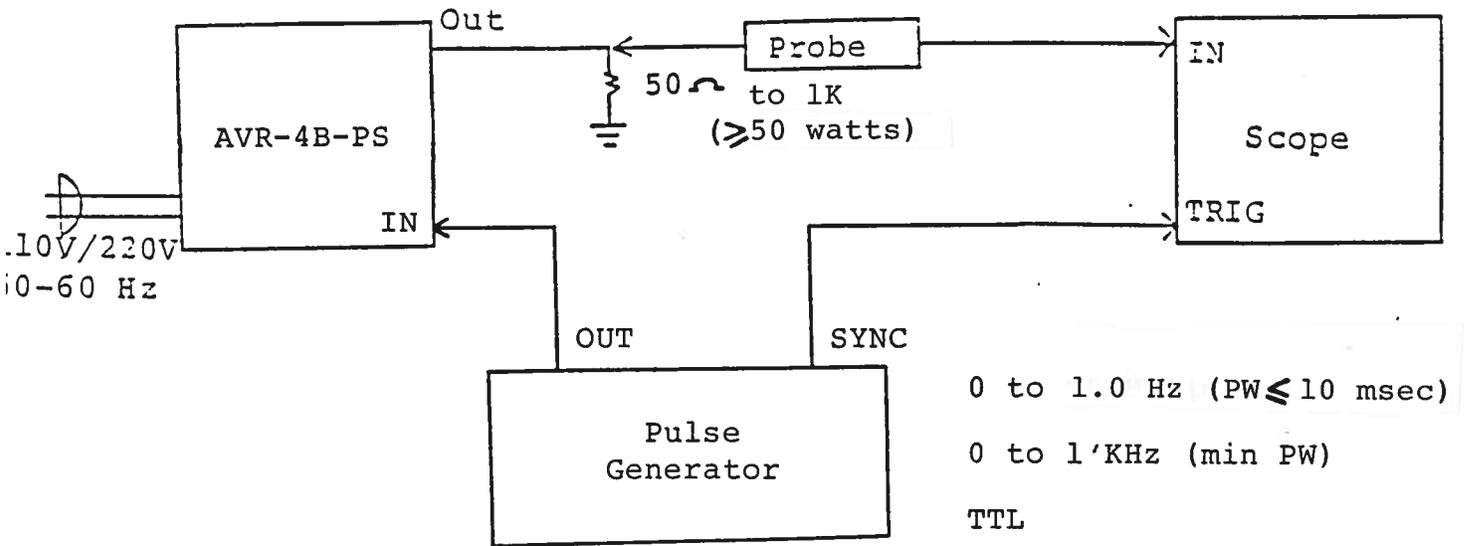
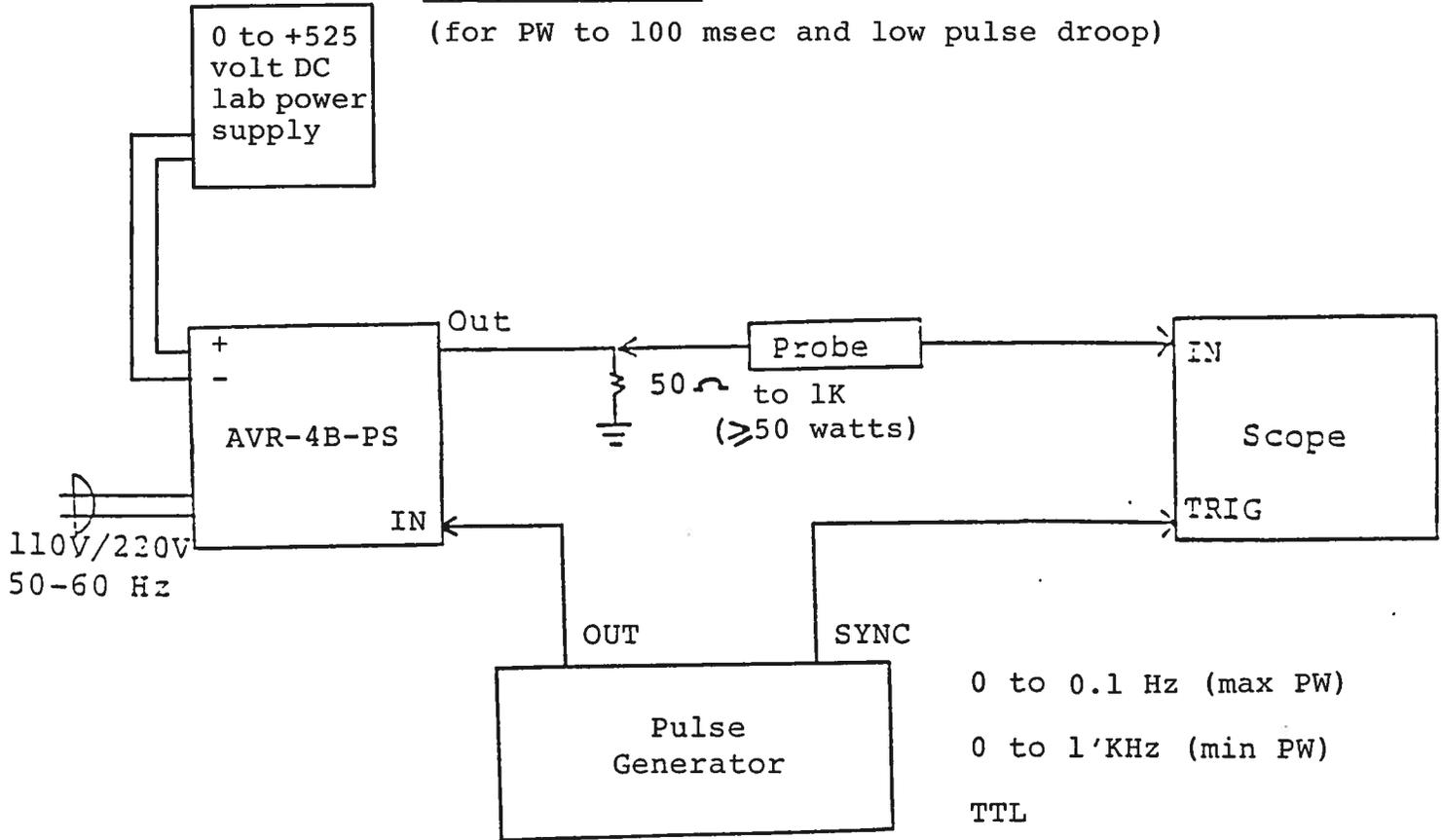


Fig. 2

PULSE GENERATOR TEST ARRANGEMENT

CONFIGURATION 2

(for PW to 100 msec and low pulse droop)



## CONFIGURATION 1

- 1) This mode is recommended for output pulse widths of less than 10 msec. At wider pulse widths the pulse droop may be as high as 25%. This high droop may be avoided by using Configuration 2. To operate in Configuration 1, place the rear panel two position switch in the INT position.
- 2) With the AB mode switch in the A position, the output pulse width is controlled by the 4 position PW range switch and the one turn PW control. 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                      |
|----|-----------------------------|-----------------------------|
| 1) | 10 usec<br>PRF max 1 KHz    | 100 usec<br>PRF max 0.1 KHz |
| 2) | 100 usec<br>PRF max 0.1 KHz | 1 msec<br>PRF max 10 Hz     |
| 3) | 1 msec<br>PRF max 10 Hz     | 10 msec<br>PRF max 1 Hz     |
| 4) | 10 msec<br>PRF max 1 Hz     | 100 msec<br>PRF max 0.1 Hz  |

- 3) With the AB mode switch in the B position, the output pulse width is equal to the input trigger pulse width.
- 4) The output pulse amplitude is controlled by means of the front panel one turn AMP control. Note that the pulse amplitude changes with a time constant of several seconds when the control knob is adjusted. This is normal and is due to the extremely large output bypass capacitor in the output power stage.
- 5) The AVR-4-PS features an output impedance of the order of several ohms (rather than 50 ohms). The following consequences of this feature should be noted:
  - a) When used to switch some semiconductor devices (eg. bipolar and VMOS power transistors), the AVR unit will yield much faster switching times than those provided by 50 ohm pulse generators.
  - b) The AVR unit will safely operate in to load impedances in the range of 50 ohms to an open circuit. However, the fall time may degrade for load impedances higher than 1000 ohms.

- c) The AVR unit may be effectively converted to a fifty ohm output impedance generator by placing a fifty ohm carbon composition resistor in series with the output of the unit and the load. The maximum available load voltage will then decrease to 250 volts (from 500 volts).
  - d) The output switching elements may fail if the unit is inadvertently operated into a short circuit. The switching elements are easily replaced in the field following the procedure outlined in the REPAIR Section.
- 6) **CAUTION:** The output stage is protected against overload condition by a 2.0 A slow blow fuse on the main frame back panel. However, the output switching elements may fail if the unit is triggered at a PRF exceeding 1 KHz or at duty cycles resulting in an average output power in excess of 50 watts. Heating and subsequent likely failure of the output stage is reduced if the following action is taken where possible:
- a) PRF is kept to a minimum, ie. operate in a low PRF range when possible rather than in a high PRF range.
  - b) Keep the output PW to a minimum.
- 7) The unit can be converted from 110 to 220V 50-60 Hz operation by adjusting the voltage selector card in the rear panel fused voltage selector cable connector assembly.

## CONFIGURATION 2

- 1) In this mode a user-supplied laboratory power supply is used to supply the output energy and to directly control the output pulse amplitude. This mode of operation allows the generation of very wide (eg. 100 msec) pulses having much lower droop than provided by Configuration 1. To operate in Configuration 2, place the rear panel two position switch in the EXT position and apply a 0 to +525 volt (2 to 10 amperes) DC lab power supply to the red and black female banana terminals (positive to red and negative to black). The black terminal is grounded to the chassis. With the switch in the EXT position the front panel AMP control is inactive. The output pulse amplitude will vary from 0 to +500 volts as the lab power supply voltage is varied from 0 to +525 volts.

### CAUTION:

- 1) Do not exceed +525 volts.
- 2) Insure that the positive potential is applied to the red banana terminal.

The following lab power supplies are typical of units acceptable for this application:

- 1) HP Model 6448B
- 2) HP Model 6483C
- 3) Sorensen Model DCR600-3B

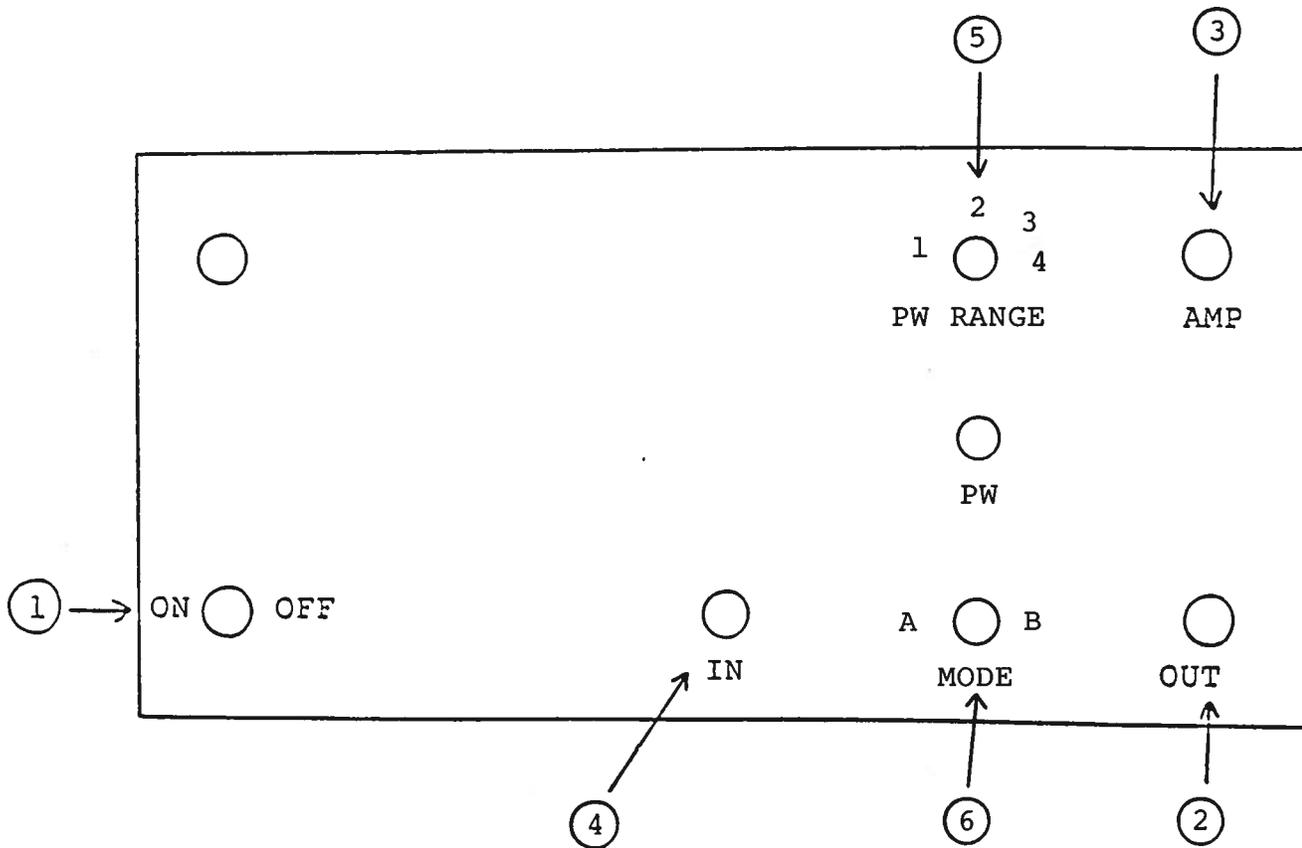
- 2) With the AB mode switch in the A position, the output pulse width is controlled by the 4 position PW range switch and the one turn PW control. The minimum and maximum PW for each range and the corresponding maximum PRF are as follows. Note that the unit may fail if operated at duty cycles exceeding the above.

|    | PW min                      | PW max                      |
|----|-----------------------------|-----------------------------|
| 1) | 10 usec<br>PRF max 1 KHz    | 100 usec<br>PRF max 0.1 KHz |
| 2) | 100 usec<br>PRF max 0.1 KHz | 1 msec<br>PRF max 10 Hz     |
| 3) | 1 msec<br>PRF max 10 Hz     | 10 msec<br>PRF max 1 Hz     |
| 4) | 10 msec<br>PRF max 1 Hz     | 100 msec<br>PRF max 0.1 Hz  |

- 3) With the AB mode switch in the B position, the output pulse width is equal to the input trigger pulse width.
- 4) The output pulse amplitude is controlled by means of the externally applied lab power supply.

Fig. 2

FRONT PANEL CONTROLS



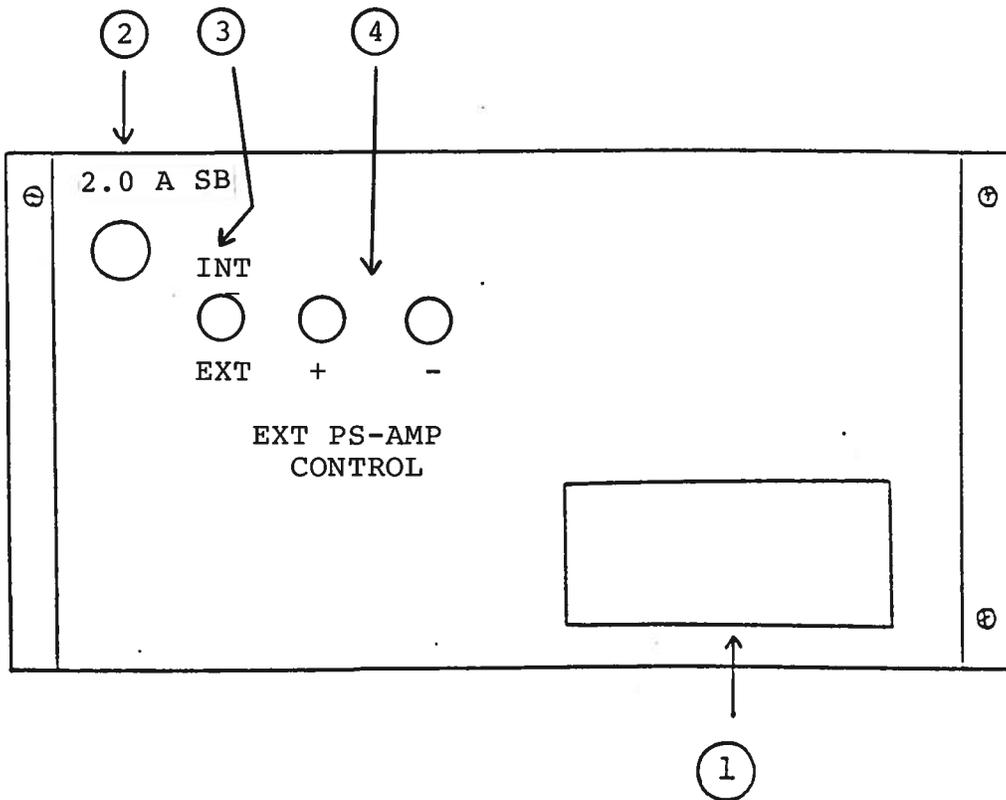
- (1) ON-OFF Switch. Applies basic prime power to all stages.
- (2) OUT Connector. BNC connector provides output to a 50 ohm load.
- (3) AMP Control. A one turn control which varies the output pulse amplitude from 0 to 500 V when the rear panel two position switch is in the INT position (Configuration 1). This control is inactive when the switch is in the EXT position (Configuration 2).
- (4) TRIG Input. The external trigger signal is applied at this input. Note that the output pulse width equals the input trigger pulse width when the MODE SWITCH AB (6) is in the B position.
- (5) PW Control. A one turn control and 4 position range switch which varies the output pulse width from 10 usec to 100 nsec when the MODE switch is in the A position. 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 | 10 usec<br>PRF max 1 KHz    | 100 usec<br>PRF max 0.1 KHz |
| Range 2 | 100 usec<br>PRF max 0.1 KHz | 1 msec<br>PRF max 10 Hz     |
| Range 3 | 1 msec<br>PRF max 10 Hz     | 10 msec<br>PRF max 1 Hz     |
| Range 4 | 10 msec<br>PRF max 1 Hz     | 100 msec<br>PRF max 0.1 Hz  |

- (6) AB MODE. When switch is in the A position output pulse width is controlled by PW controls (5) while if switch is in the B position, the output pulse width equals the input trigger pulse width.

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 (1.0 A SB).
- (2) 2.0 A SB. Protects output stage against overload condition.
- (3) INT-EXT SWITCH. To operate in Configuration 1 (front panel AMP control active) place this switch in the INT mode. To operate in Configuration 2 (output amplitude controlled by externally applied 0 to 525 volt lab power supply) place switch in EXT position.
- (4) EXT PS-AMP CONTROL. To operate in Configuration 2, place switch in EXT position and apply 1 to +525 volts to red banana terminal.

AVR-4B-P-PW-EXA

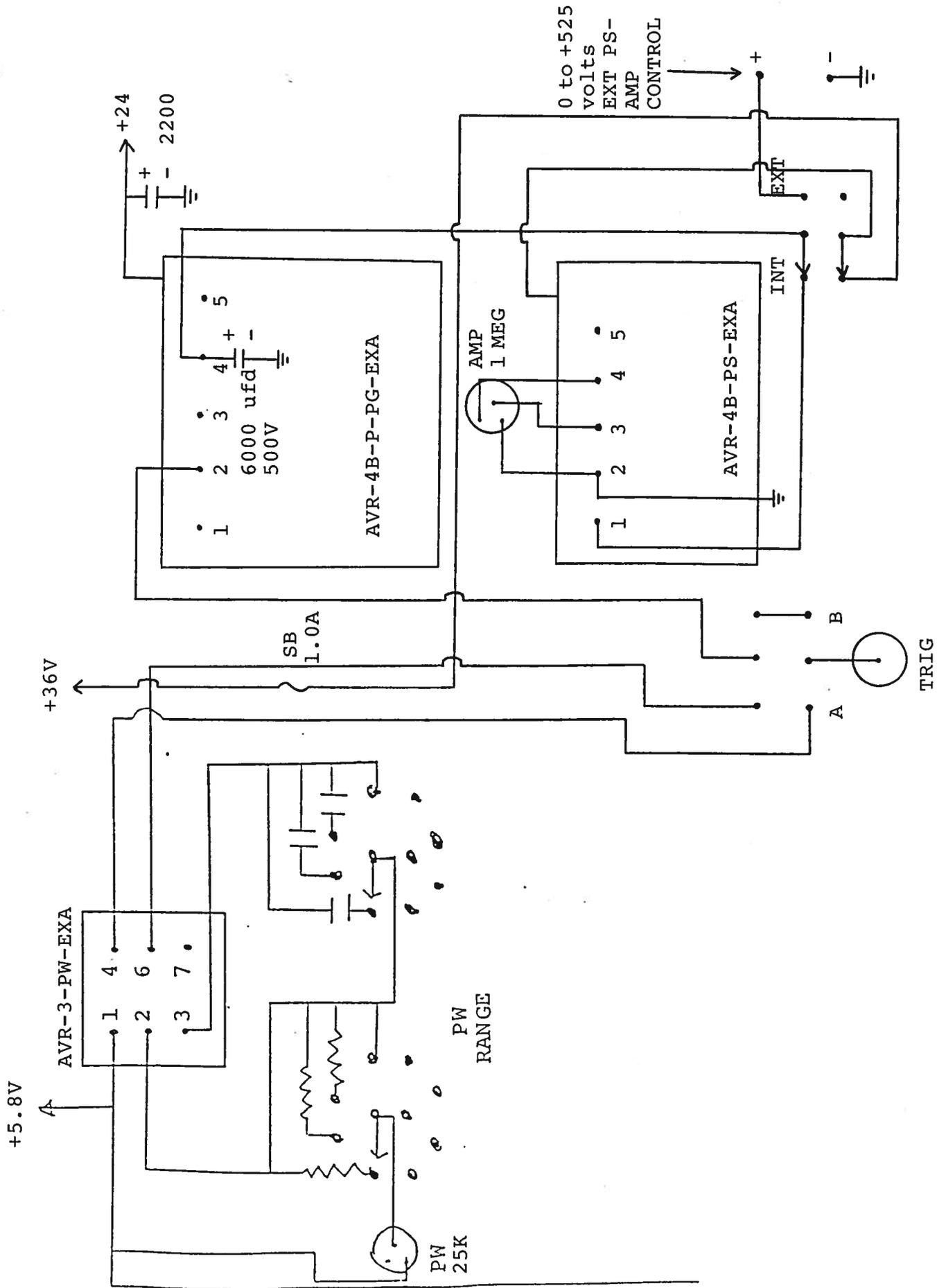
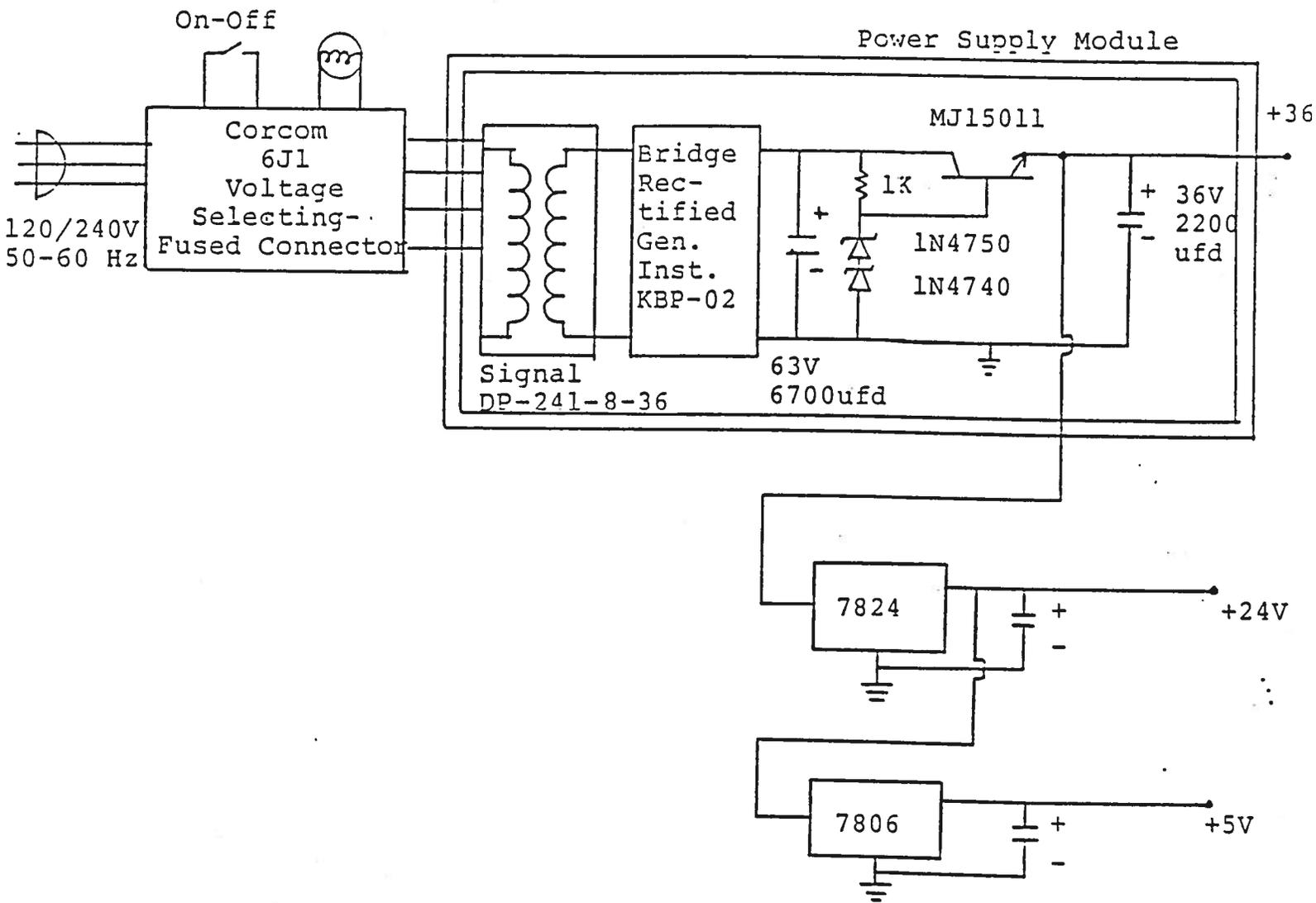


Fig. 4a

POWER SUPPLY



## SYSTEM DESCRIPTION AND REPAIR PROCEDURE

CAUTION: Potentials as high as 550 volts DC are employed in the interior of this instrument so extreme caution must be exercised when attempting repairs. The following parts may be at high potential:

- a) Pin 4 of module AVR-4B-PG-EXA (including associated leads and capacitors).
- b) All pins on module AVR-4B-PS-EXA (and associated leads and capacitors).

The AVR-4-PS consists of the following basic modules:

- 1) AVR-4-PW-PG pulse generator module
- 2) AVR-4-PS power supply module
- 3) AVR-4-PW pulse width module

The modules are interconnected as shown in Fig. 4.

In the event of an instrument malfunction, it is most likely that the 2.0 A slow blow fuse or the main power fuse on the rear panel has blown. Replace if necessary. If the unit still does not function, it is most likely that some of the output switching elements (SL20) 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 top cover plate. The cover plate is removed by removing the 4 Phillips screws on the back panel. NOTE: First turn off the prime power. CAUTION: Briefly ground the SL20 cases to discharge the 500 volts power supply potential. The elements may be removed from their sockets after removing the four 2-56 Phillips screws. The SL20 is a selected VMOS power transistor in a modified TO3 package and may be checked on a curve tracer. If defective, replacement units should be ordered directly from Avtech.

Schnoff

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