AVTECH ELECTROSYSTEMS LTD.

NANOSECOND WAVEFORM ELECTRONICS
ENGINEERING – MANUFACTURING

☐ P.O. BOX 265
OGDENSBURG
NEW YORK
13669
(315) 472-5270

☒ BOX 5120, STN. "F"
OTTAWA, ONTARIO
CANADA K2C 3H4
TEL: (613) 226-5772
FAX: (613) 226-2802
TELEX: 053-4591

INSTRUCTIONS

MODEL AVR-4A-PW-PS PULSE GENERATOR

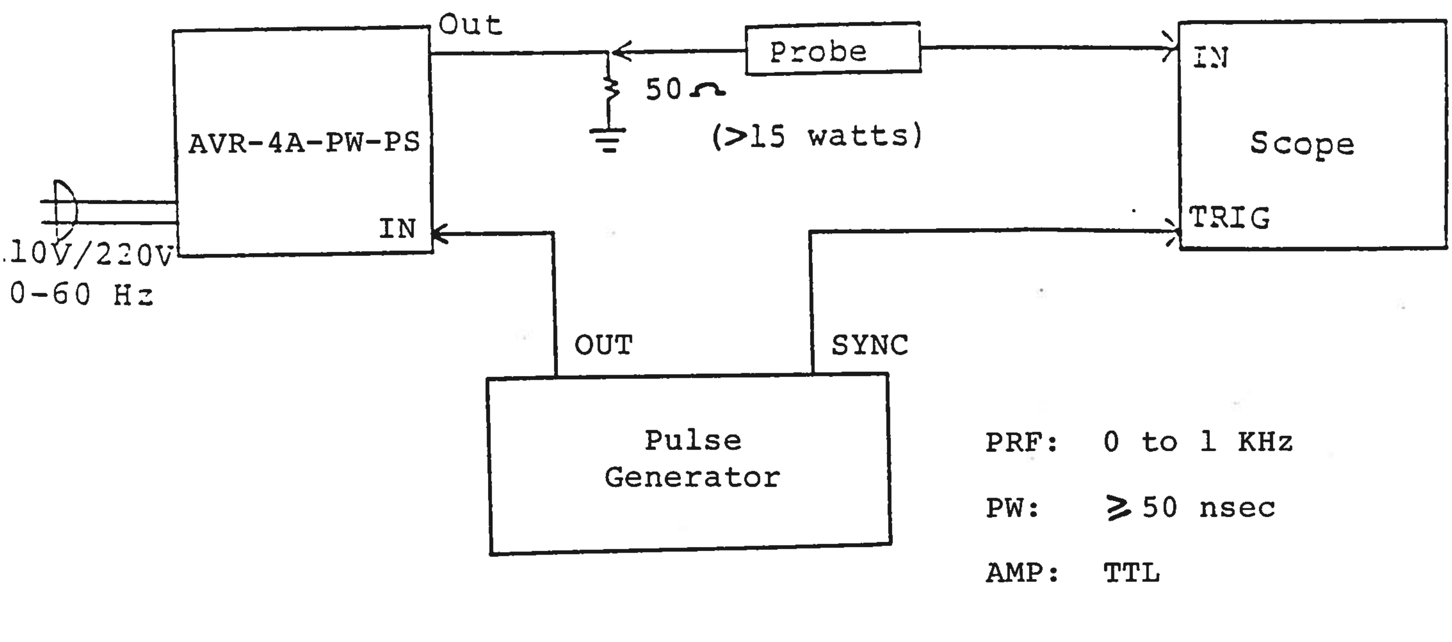
S.N.:

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 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



Notes:

1) The bandwidth capability of components and instruments used to display the pulse generator output signal (attenuators, cables, connectors, etc.) should exceed 100 MHz.

2) The output pulse width is controlled by means of the front panel one turn PW control. To voltage control the output pulse width, set the rear panel switch in the EXT position and apply 0 to +10V to connector A ($R_{IN} \geq$ 10K). (option).

3) The output pulse amplitude is controlled by means of the front panel one turn AMP control. To voltage control the output amplitude, set the rear panel switch in the EXT position and apply 0 to +10V to connector B ($R_{IN} \geq$ 10K). (option).

4) 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 200 volts (from 400 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.

5) CAUTION: The output stage is protected against overload condition by a 1.0 A slow blow fuse on the main frame back panel. However, the output switching elements (SL19T) 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 16 watts. Heating and subsequent likely failure of the output stage is reduced if the following action is taken where possible:

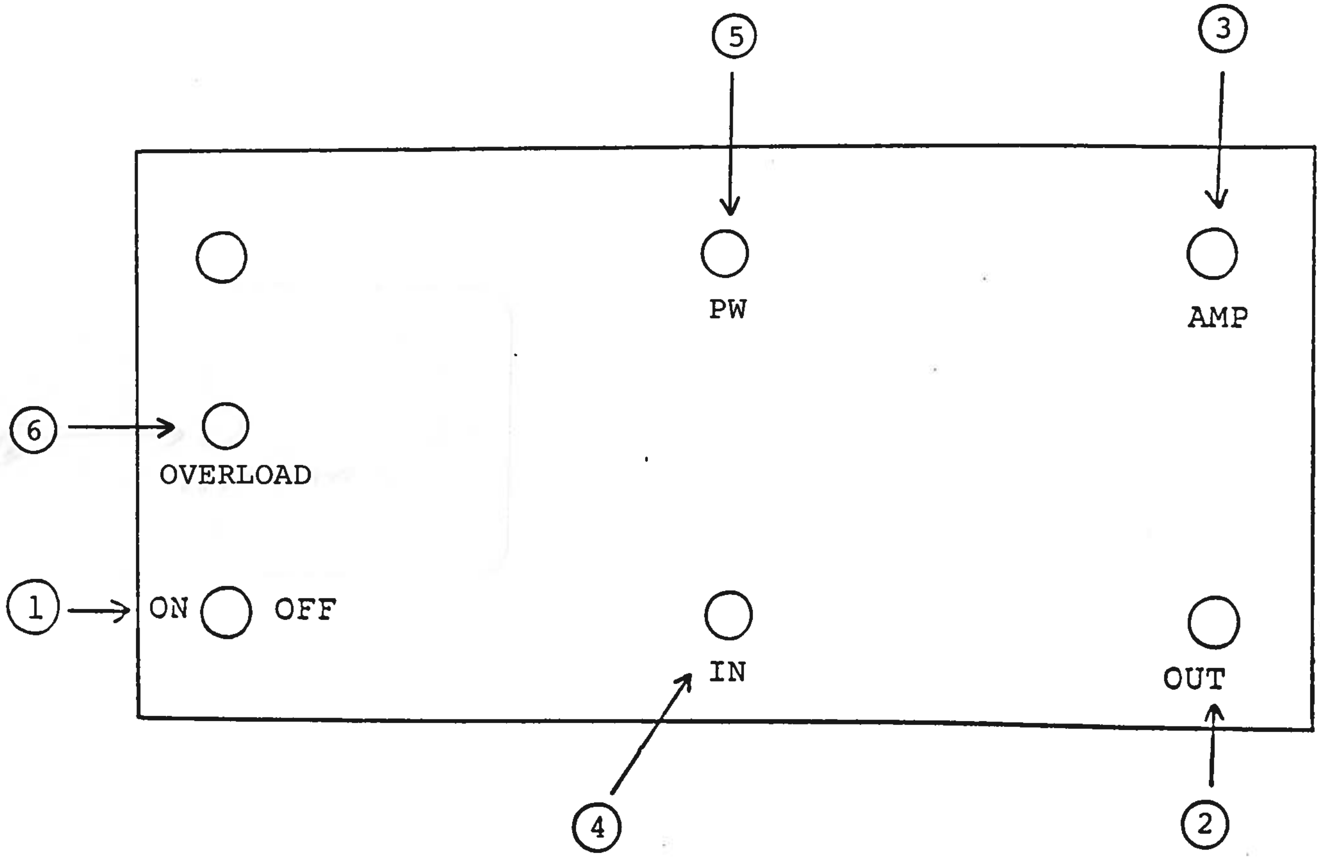
a) PRF is kept to a minimum, ie. operate in a low PRF range when possible rather than in a high PRF range.
b) Keep the output PW to a minimum.

6) AVR-4-PW-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)
3) Removing output load short circuit (if any)

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.

Fig. 2 FRONT PANEL CONTROLS



(1) <u>ON-OFF Switch</u>. Applies basic prime power to all stages.

(2) <u>OUT Connector</u>. BNC connector provides output to a 50 ohm load.

(3) <u>AMP Control</u>. A one turn control which varies the output pulse amplitude from 0 to 400 V.

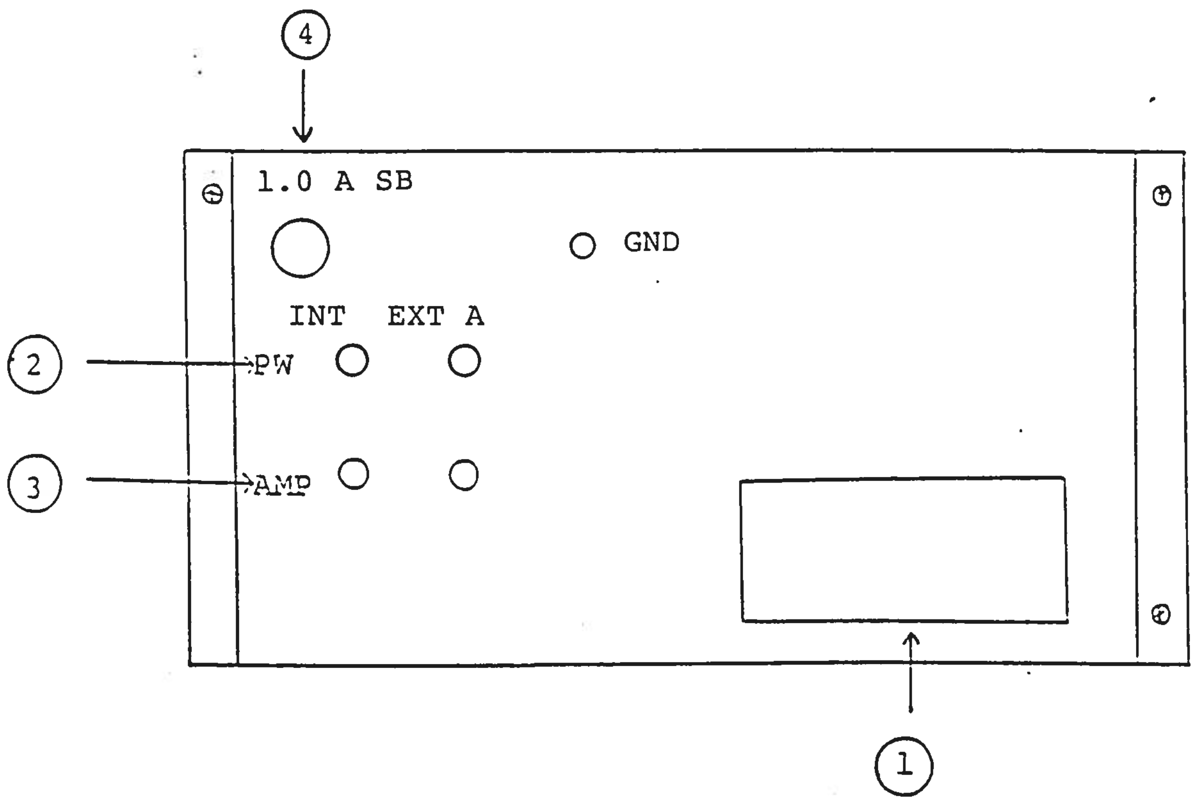
(4) <u>TRIG Input</u>. The external trigger signal is applied at this input.

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

(6) <u>OVERLOAD</u>. AVR-4-PW-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)
3) Removing output load short circuit (if any)

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 (0.5 A SB).

(2) To voltage control the output pulse width, set the switch in the EXT position and apply 0 to +10V to connector A ($R_{IN} \geq$ 10K). (option).

(3) To voltage control the output amplitude, set the switch in the EXT position and apply 0 to +10V to connector A ($R_{IN} \geq$ 10K). (option).

(4) 1.0 A SB. Protects output stage against overload condition.

Fig. 4

AVR-4A-PS BLOCK DIAGRAM

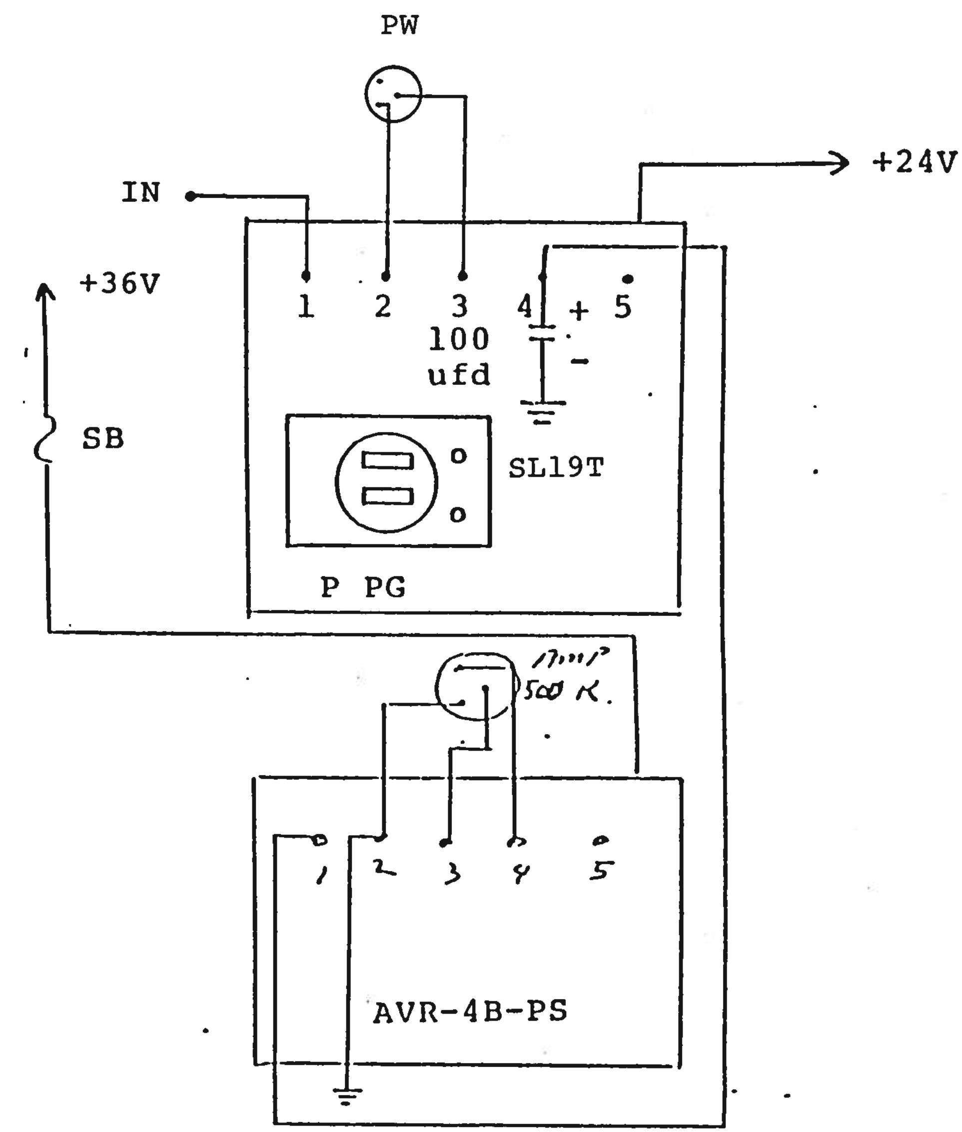
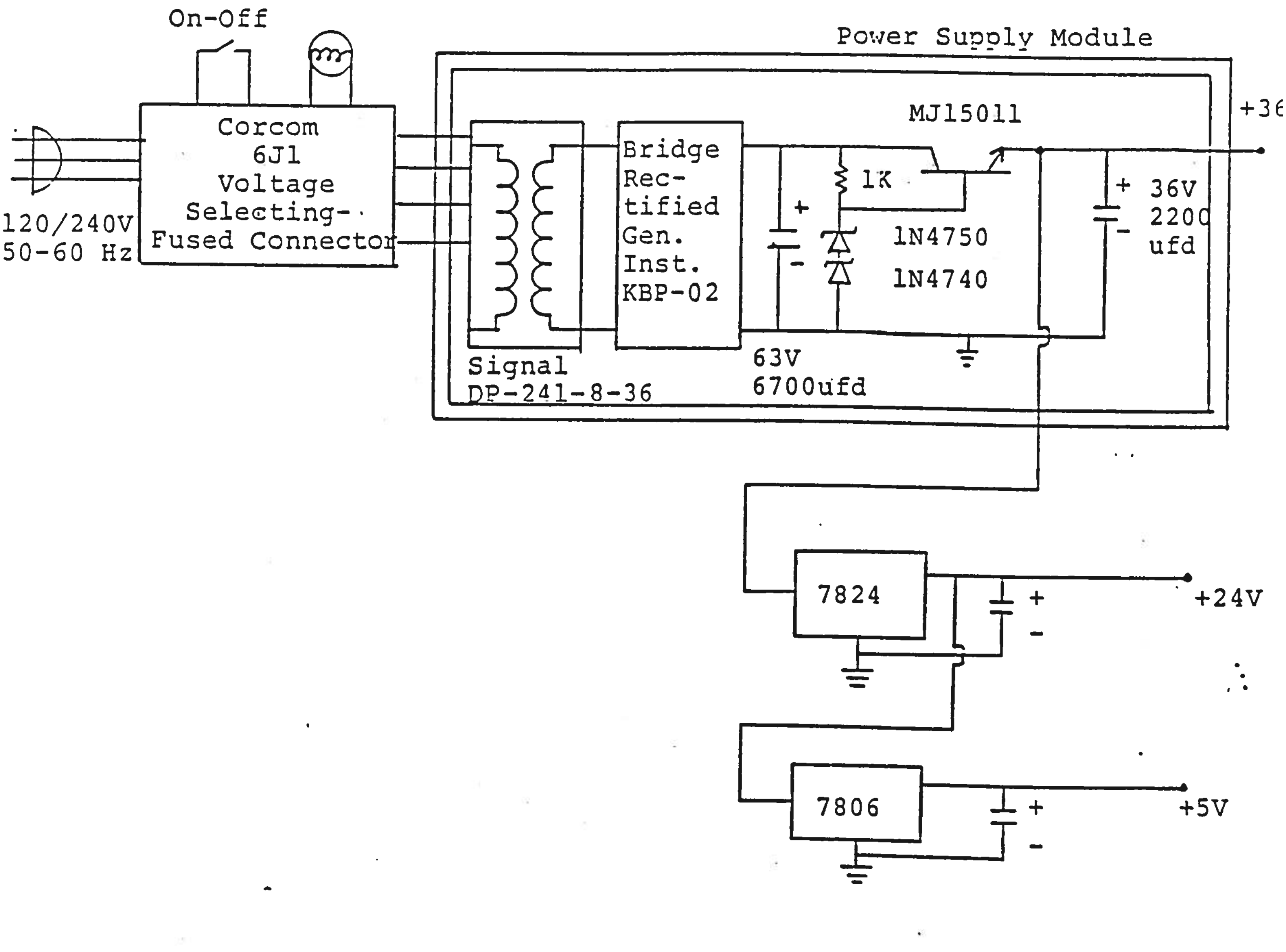
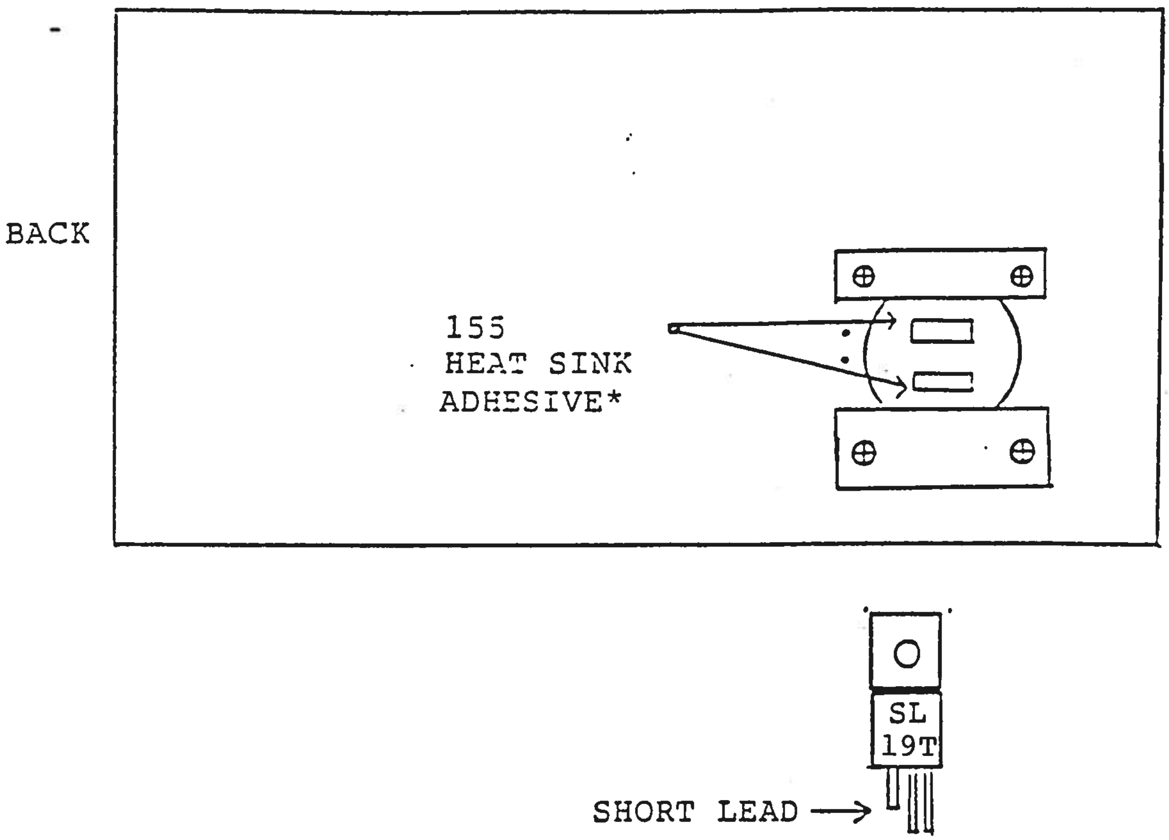


Fig. 4a

POWER SUPPLY



SL19T HEAT SINKING



SYSTEM DESCRIPTION AND REPAIR PROCEDURE

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

The modules are interconnected as shown in Fig. 4.

In the event of an instrument malfunction, it is most likely that the 1.0 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 (SL19T) 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 plates on the bottom side of the instrument. The cover plate is removed by removing the two 2-56 Phillips screws. NOTE: First turn off the prime power. CAUTION: Briefly ground the SL19T tabs to discharge the 400 volts power supply potential. 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 instrument. The SL19T is a selected VMOS power transistor in a TO 220 package and may be checked on a curve tracer. If defective, replacement units should be ordered directly from Avtech. When replacing the SL19T switching elements, take care to insure that the short lead (of the three leads) is adjacent to the back of the chassis. (See following Fig.). The SL19T elements are electrically isolated from the small aluminum heat sinks but are bonded to the heat sinks using WAKEFIELD TYPE 155 HEAT SINK ADHESIVE.

Schroff 11.08.90 Edition B

- EW
- EA