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SINCE 1975

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INSTRUCTIONS

MODEL AVR-G1-C-P-OS-UCB PULSE GENERATOR

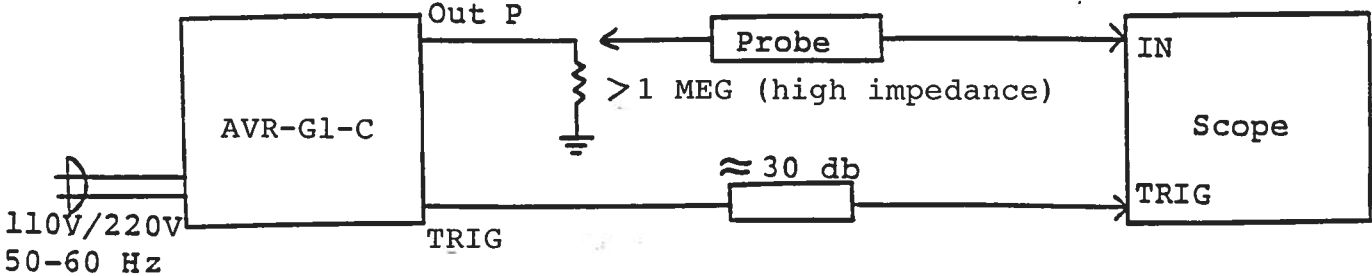
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WARRANTY

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



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) This unit was specifically designed to drive high impedance loads ($R_L \geq 1$ MEG). The unit may fail if operated into low impedance loads (eg. 50 Ohm).
- 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. CAUTION: Do not exceed the duty cycle rating of 5% (eg. 100 ns at 500 kHz).
- 5) The output pulse width is controlled by means of the front panel one turn PW control and by the PW RANGE 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 20%.

| | PW min | PW max |
|---------|--------------------------|---------------------------|
| Range 1 | 1.0 us PRF max 50 Hz | 1.0 us PRF max 500 Hz |
| Range 2 | 1.0 us PRF max 500 Hz | 1 us PRF max 5 kHz |
| Range 3 | 1 us PRF max 5 kHz | 1 us PRF max 50 kHz |
| Range 4 | 1 us PRF max 50 kHz | 100 ns PRF max 500 kHz |

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

- 6) 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 +10 Volts between terminal A and ground ($R_{IN} > 10K$). (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 0.2 us (approx.) TTL level pulse to the TRIG BNC connector input.
- 8) A DC offset may be applied to the output pulse by applying the desired DC level (0 to ± 350 Volts) to the rear panel OS solder terminals.
- 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)
- 10) If additional assistance is required;

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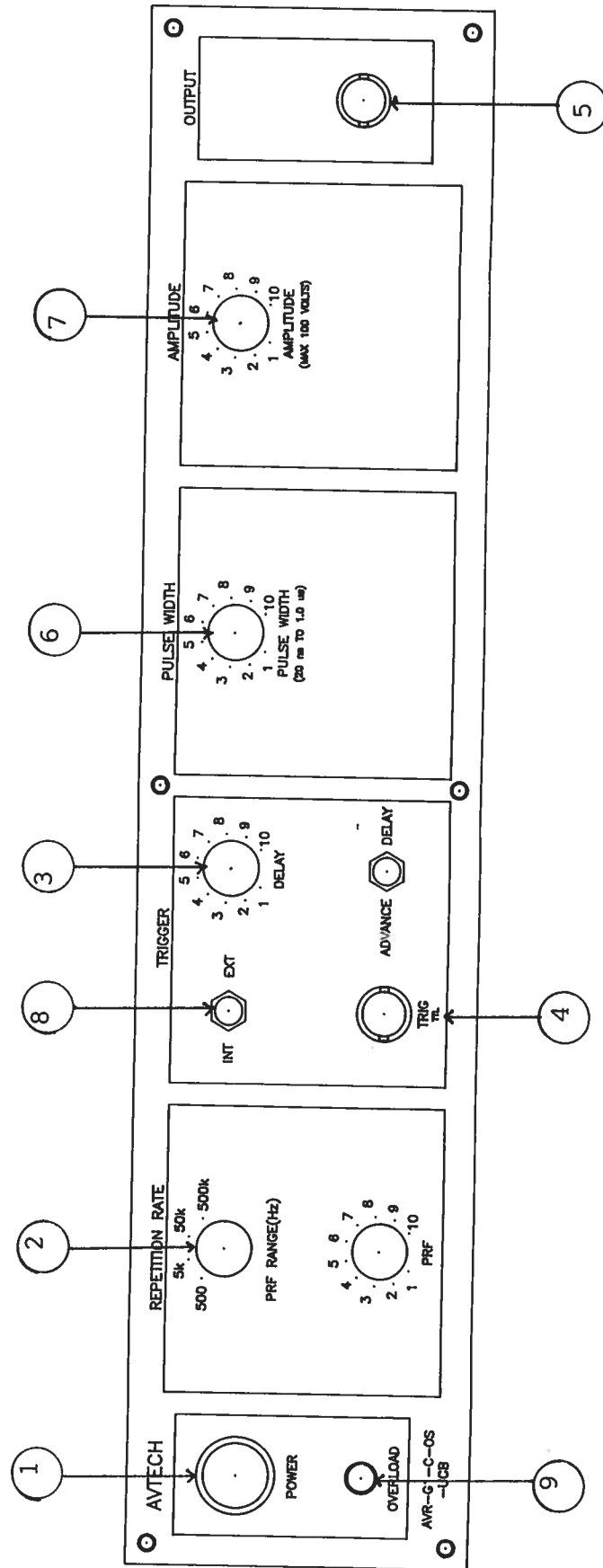


Fig. 2 FRONT PANEL CONTROLS

- (1) ON-OFF Switch. Applies basic prime power to all stages.
- (2) PRF Control. Varies PRF from 50 Hz to 5 kHz as follows:

| | | |
|---------|-----------|-----|
| Range 1 | 50 to 500 | Hz |
| Range 2 | 0.5 to 5 | kHz |
| Range 3 | 5 to 50 | kHz |
| Range 4 | 50 to 500 | kHz |

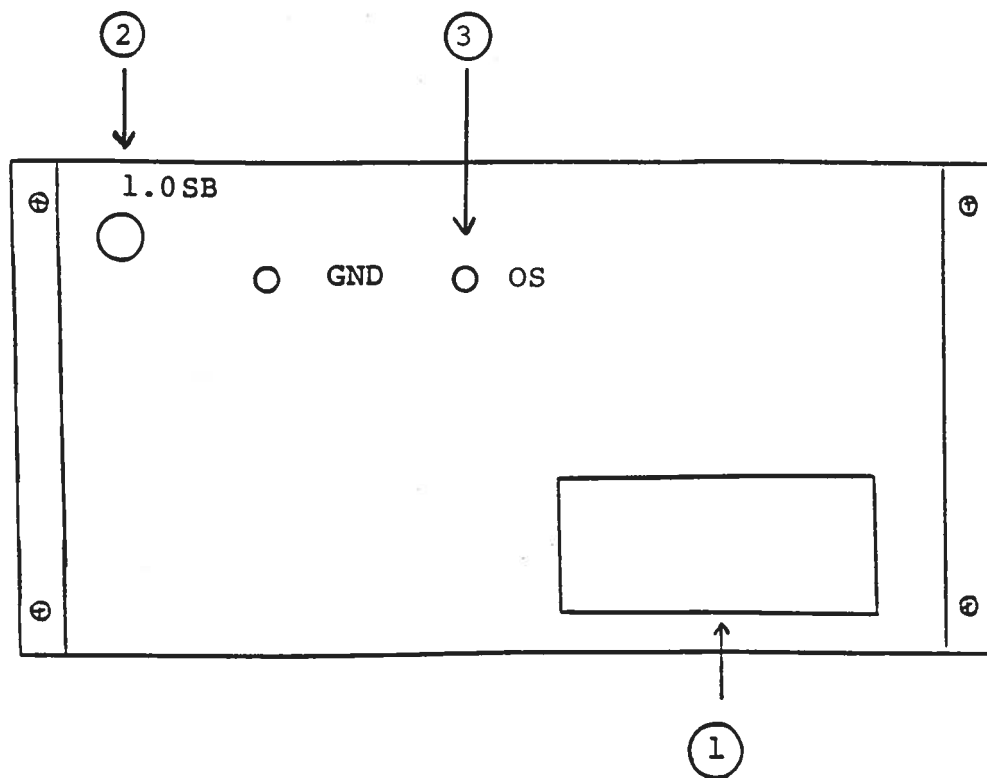
- (3) DELAY Control. Controls the relative delay between the reference output pulse provided at the TRIG output (4) the main output (5). This delay is variable over the range of 0.1 to about 1.0 us. Delay LEADS or LAGS depending on the position of the ADVANCE-DELAY switch.
- (4) TRIG Output. This output is used to trigger the scope time base. The output is a TTL level 100 ns (approx.) pulse capable of driving a fifty Ohm load. This output precedes the output at (5) if the two position ADVANCE-DELAY switch is in the ADVANCE position. This output follows the output at (5) if the switch is in the DELAY position. The delay range is variable from 0.1 to 1.0 us. The external trigger signal is applied at this input when the EXT-INT toggle switch is in the EXT position.
- (5) OUT Connector. BNC connector provides output to a high impedance load (≥ 1 MEG).
- (6) PW Control. This one turn control varies the output pulse width from 20 ns to 1.0 us. Note that the unit may fail if operated at duty cycles exceeding 5%.
- (7) AMP Control. A one turn control which varies the output pulse amplitude from 0 to 100 V to a high impedance load ($R_L \geq 1$ MEG).
- (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 control. With the toggle switch in the EXT position, the AVR unit requires a 0.2 us 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) 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)

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 (0.50 Amp SB)
- (2) 1.0 SB. Fuse which protects the output stage if the output duty cycle rating is exceeded.
- (3) OS. To DC offset the out pulse from 0 to +350 Volts, apply the required DC potential (0 to +350 Volts) to this terminal.

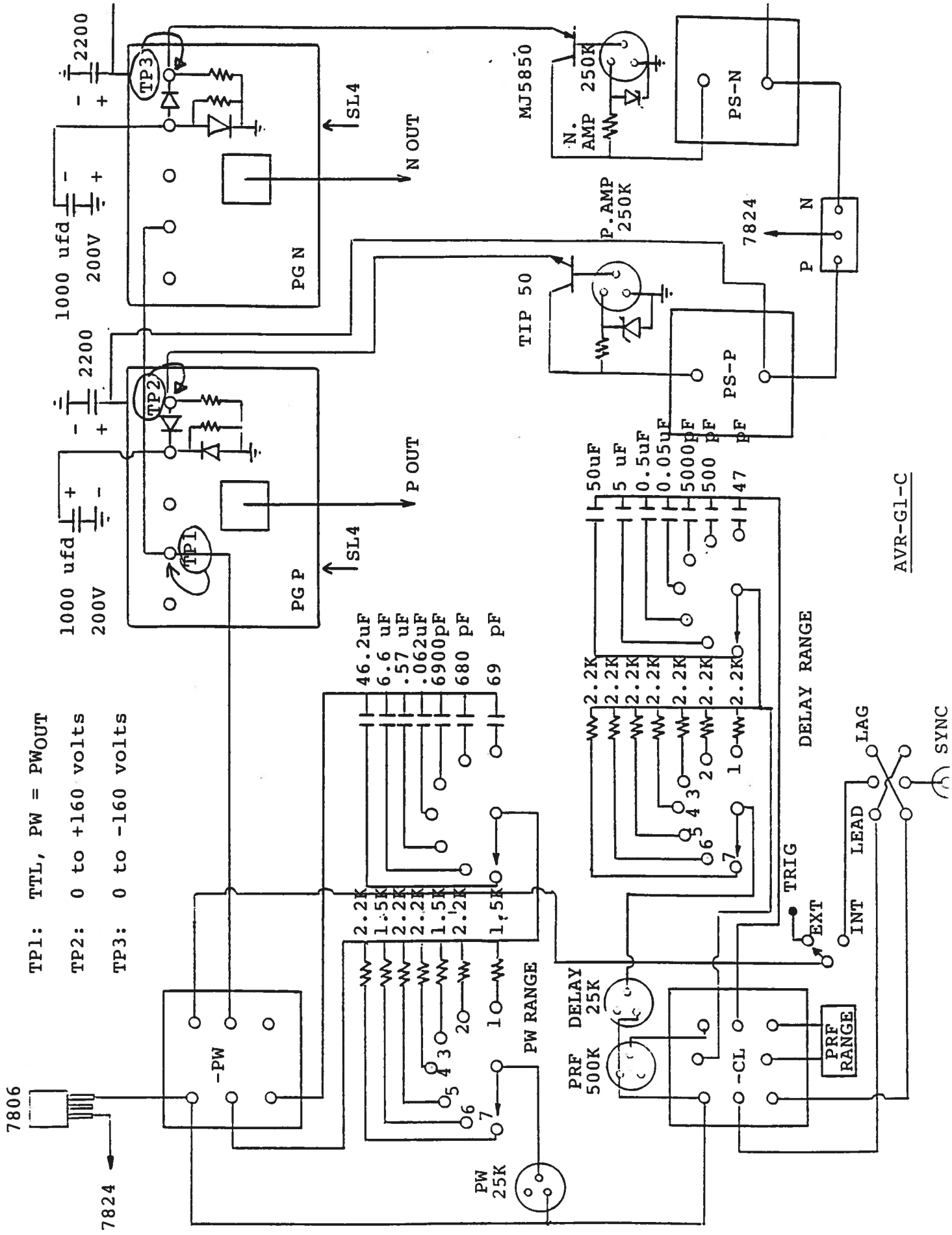


Fig. 4a

POWER SUPPLY

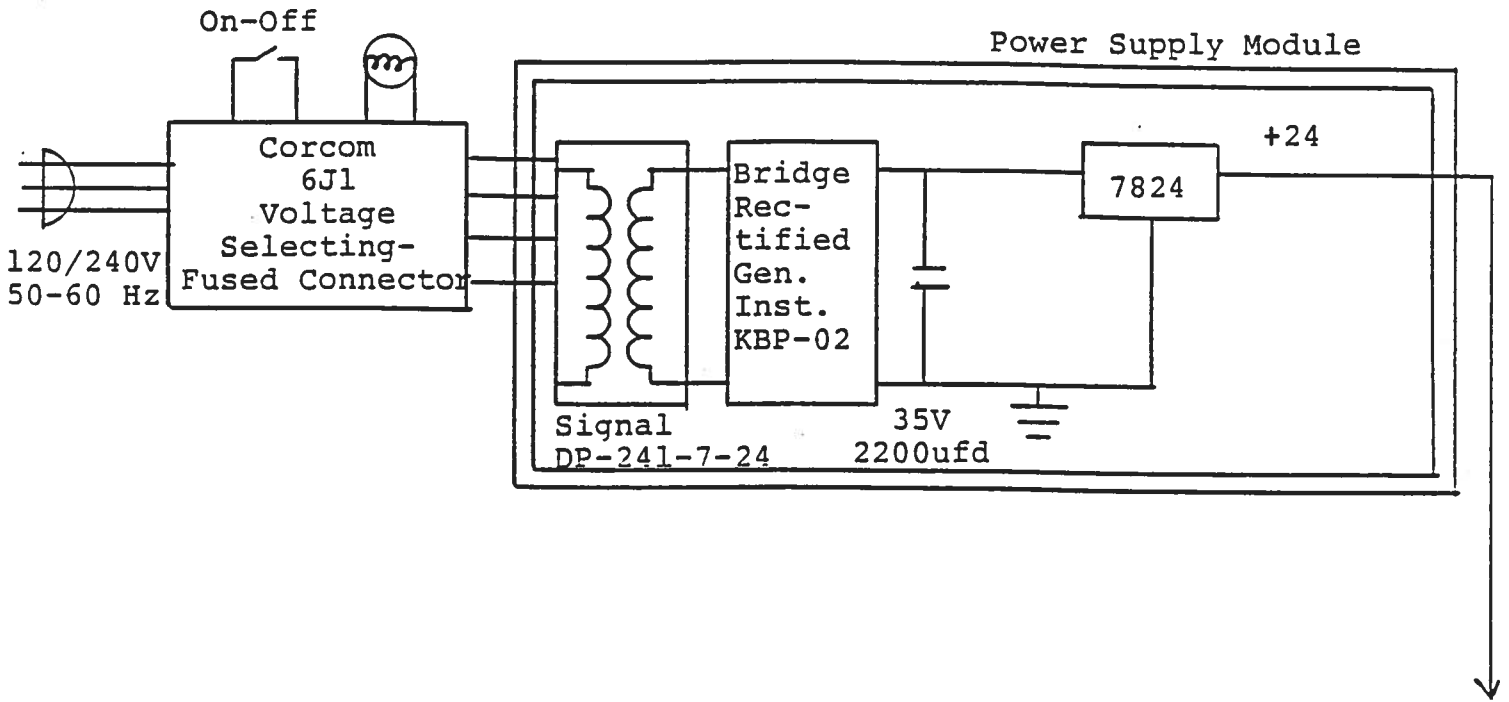


Fig. 4b

SYSTEM DESCRIPTION AND REPAIR PROCEDURE

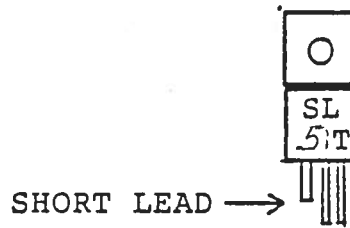
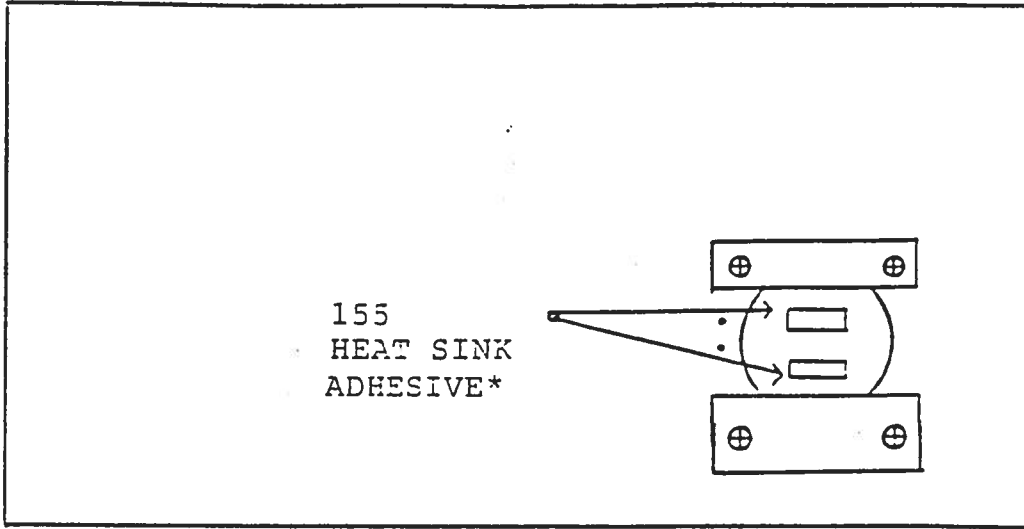
The AVR-G1-C consists of the following basic modules:

- 1) AVR-G1-PG pulse generator module
- 2) AVR-G1-CL clock module
- 3) +24V power supply board
- 4) AVR-G1-OS offset module
- 5) AVR-OL 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 outputs. The PG pulse generator modules generate the output pulse. The OS module applies the DC offset to the output pulse. In the event of an instrument malfunction, it is most likely that the rear panel 1.0A SB fuse or some of the output switching elements (SL5T) 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 instrument. NOTE: First turn off the prime power. CAUTION: Briefly ground the SL5T tabs to discharge the 100 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 SL5T 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 SL5T 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 SL5T elements are electrically isolated from the small aluminum heat sinks but are bonded to the heat sinks using WAKEFIELD TYPE 155 HEAT SINK ADHESIVE.

SL5T HEAT SINKING

BACK



Sept. 14/94