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## INSTRUCTIONS

MODEL AVR-1-PW-C-MA2 PULSE GENERATOR

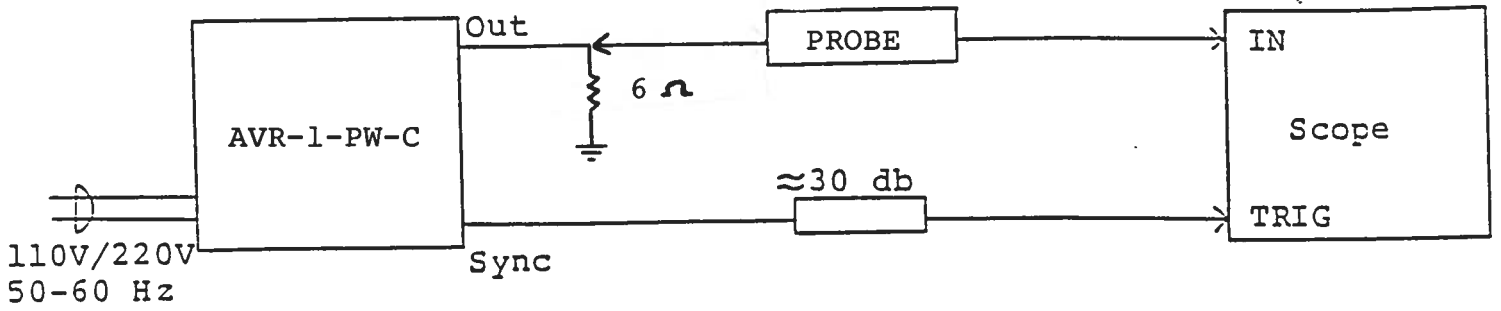
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### WARRANTY

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) 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 LEAD-LAG switch is in the LEAD position. The TRIG output lags the main output when the switch is in the LAG position.
- 3) 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.
- 4) 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 ( $R_{IN} > 10K$ ). (option).
- 5) 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 ( $R_{IN} > 10K$ ). (option).
- 6) An external clock may be used to control the output PRF of the AVR unit by setting the front panel SYNC toggle switch in the EXT position and applying a 0.2 usec (approx.) TTL level pulse to the SYNC 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.
- 7) CAUTION: The output duty cycle for the output must not exceed 1.0% (or the output stage may be damaged). For example, at the maximum pulse width of 2 us, the PRF must not exceed 5 KHz. For pulse width of 0.5 us or less the PRF may be as high as 20 KHz.

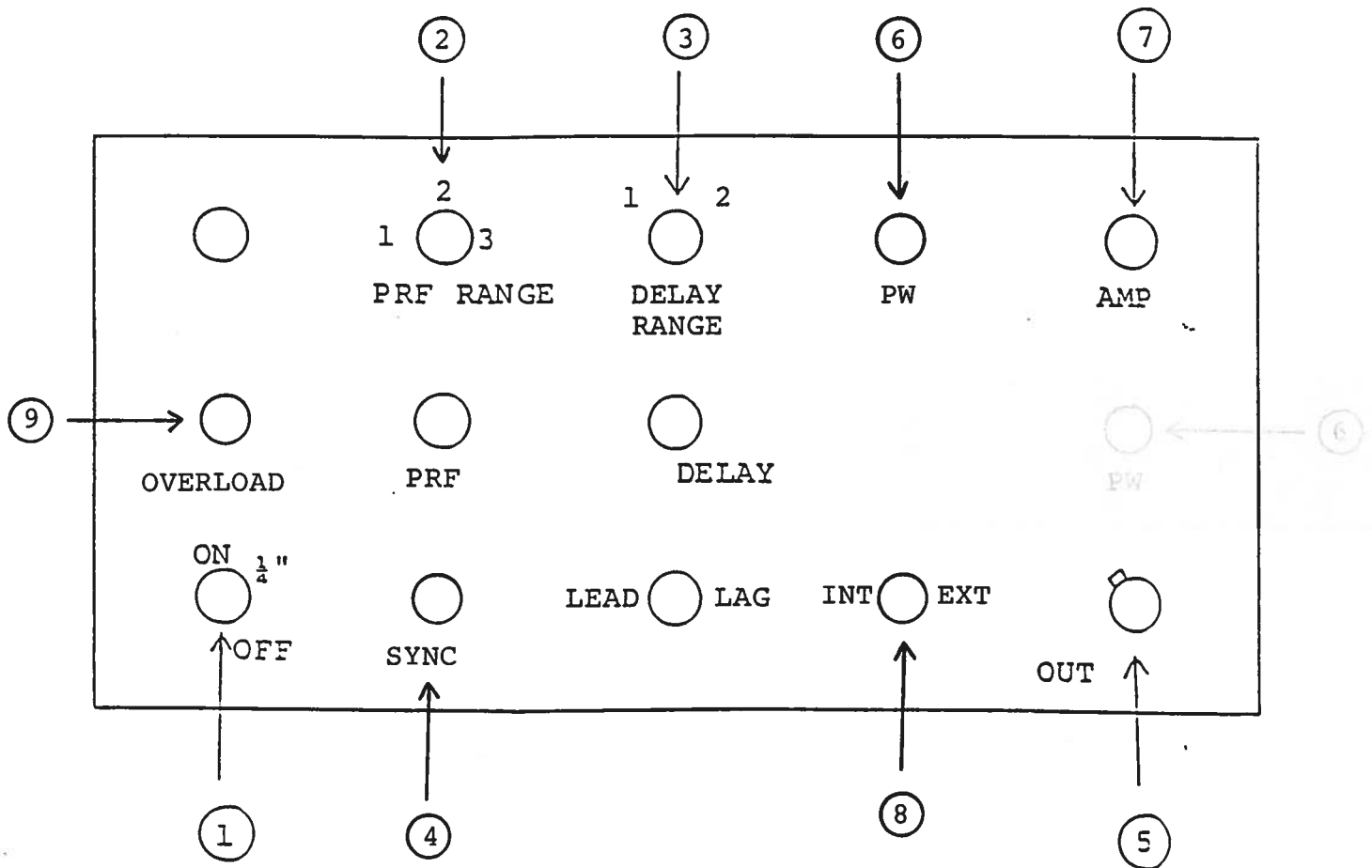
AVR units with a serial number higher than 5600 are protected by an automatic overload protective circuit which controls the front panel overload light. If the unit is overloaded (by operating at an exceedingly high duty cycle or by operating into a short circuit), the

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. 2

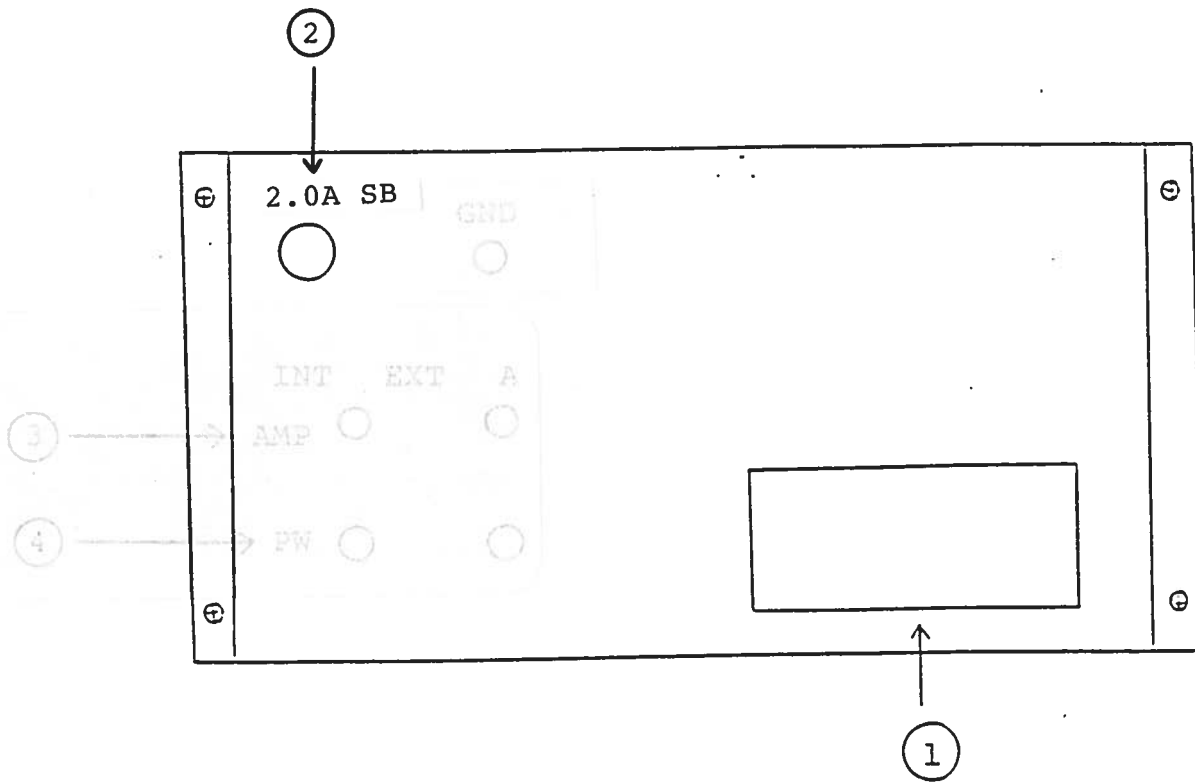
FRONT PANEL CONTROLS



- (1) ON-OFF Switch. Applies basic prime power to all stages.
- (2) PRF Control. Controls PRF as follows:
- |         |        |        |
|---------|--------|--------|
| RANGE 1 | 20 Hz  | 200 Hz |
| RANGE 2 | 200 Hz | 2 KHz  |
| RANGE 3 | 2 KHz  | 20 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 to about 1.0 usec (RANGE 1) and 1.0 to 5.0 usec (RANGE 2). The TRIG output precedes the main output when the LEAD-LAG switch is in the LEAD position and lags when the switch is in the LAG position.
- (4) SYNC Output. This output 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.
- (5) OUT Connector. BNC connector provides output to a six ohm load.
- (6) PW Control. A ten turn control which varies the output pulse width from 0.3 usec to 2 usec.
- (7) AMP Control. A ten turn control which varies the output pulse amplitude from 0 to 150V to a 6 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 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.
- (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)

Fig. 3

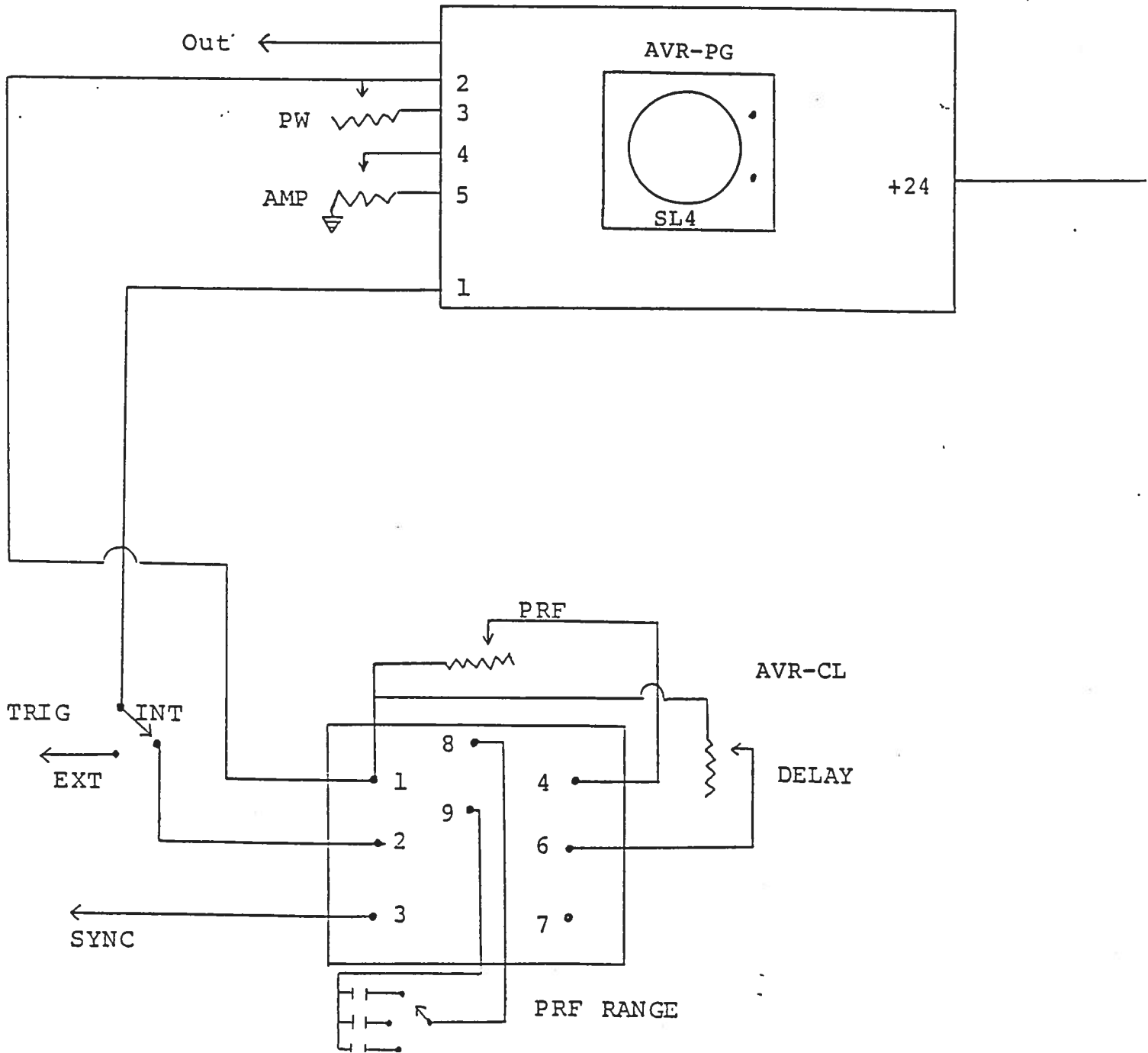
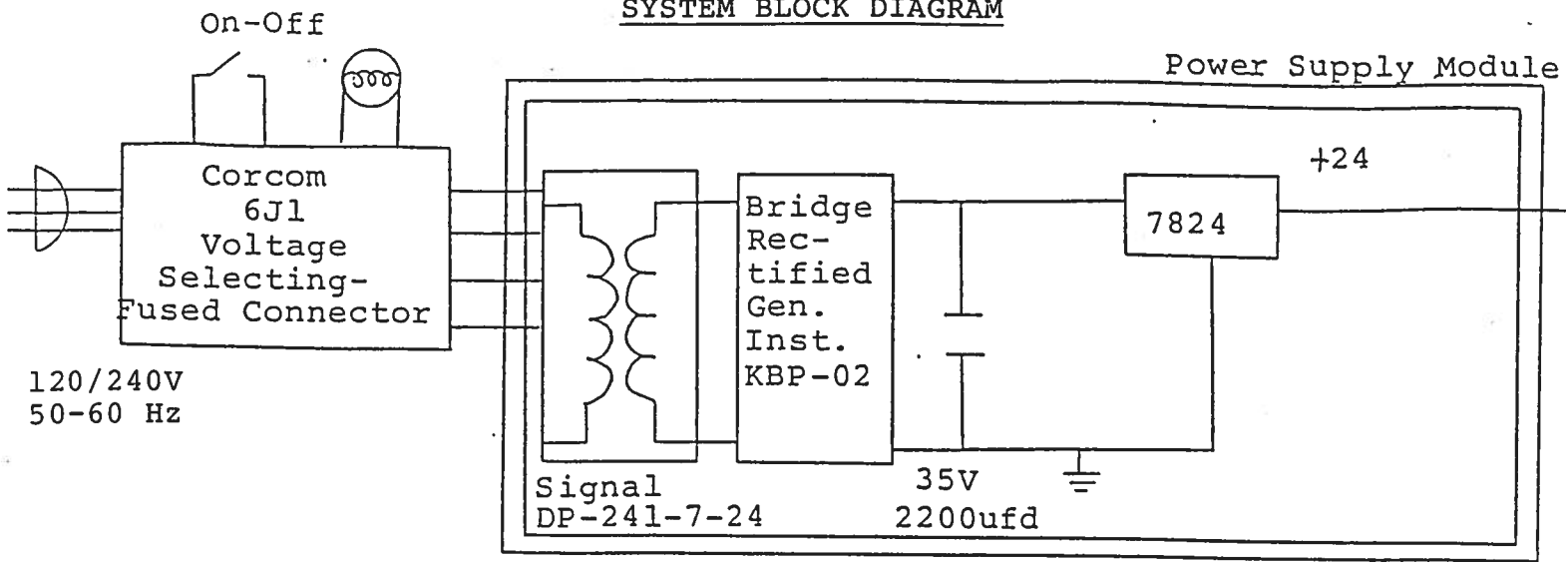
BACK PANEL CONTROLS





- (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 (1.0A SB).
- (2) 2.0 A SB. Fuse which protects the output stage if the output duty cycle rating is exceeded.

SYSTEM BLOCK DIAGRAM



## SYSTEM DESCRIPTION AND REPAIR PROCEDURE

The AVR-1-PW-C consists of the following basic modules:

- 1) AVR-1-PW-MA2 pulse generator module
- 2) AVR-CL clock module
- 3) +36V, +24V, +5.8V power supply board
- 4) AVR-1-PW-MA2 power supply module

The modules are interconnected as shown in Fig. 4.

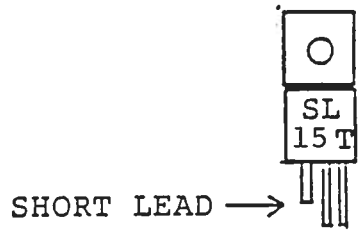
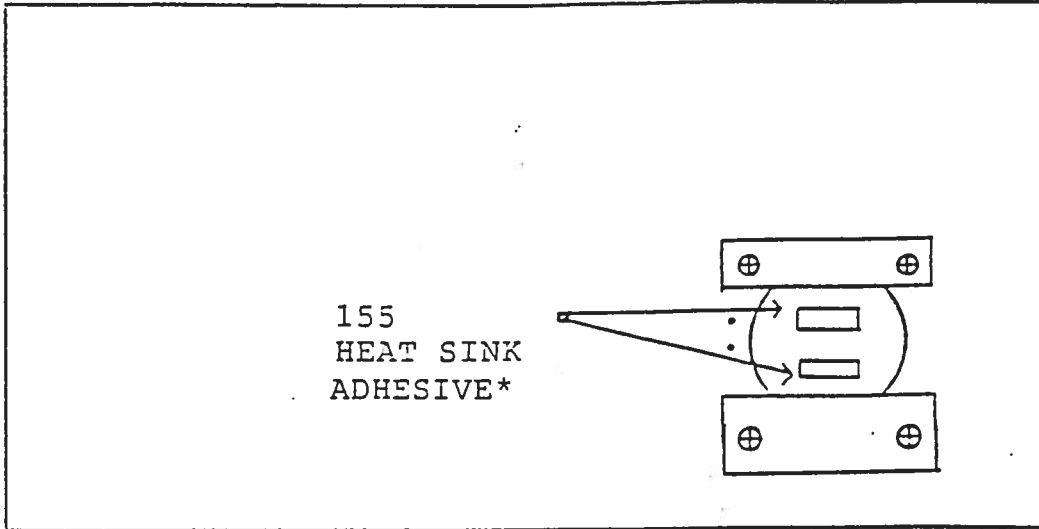
In the event of an instrument malfunction, it is most likely that the 2.0 A slow blow fuse or the main power fuse on the rear panel has blown. Replace if necessary. If the unit still does not function, it is most likely that some of the output switching elements (SL15T) may have failed due to an output 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 SL15T tabs to discharge the 170 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 SL15T 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 SL15T 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 SL15T 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 20 Hz to 20 KHz using the PRF controls.
- c) The relative delay between the pin 2 and 3 outputs can be varied by at least 1 nsec by the DELAY control.

The sealed clock module must be returned to Avtech for repair or replacement if the above conditions are not observed.

SL15T HEAT SINKING

BACK



Schnoff

06.03.91

-EW

-EA