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## INSTRUCTIONS

MODEL AVR-A-1-PW-C-P-UM1 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

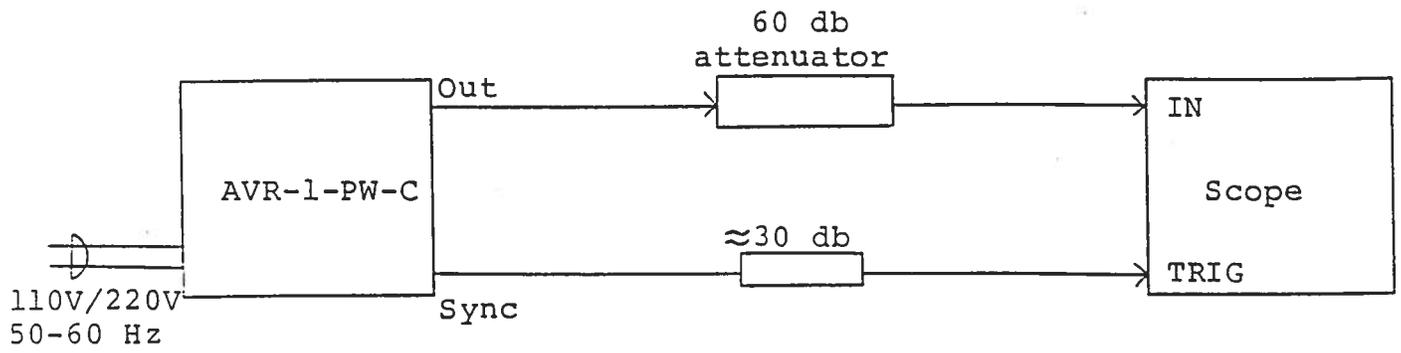
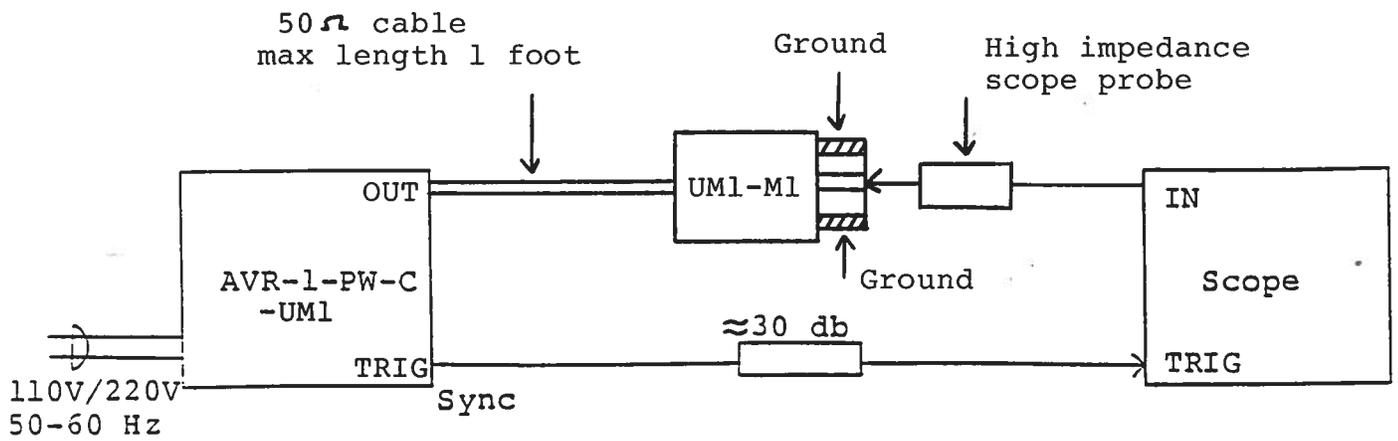


Fig. 1

PULSE GENERATOR TEST ARRANGEMENT



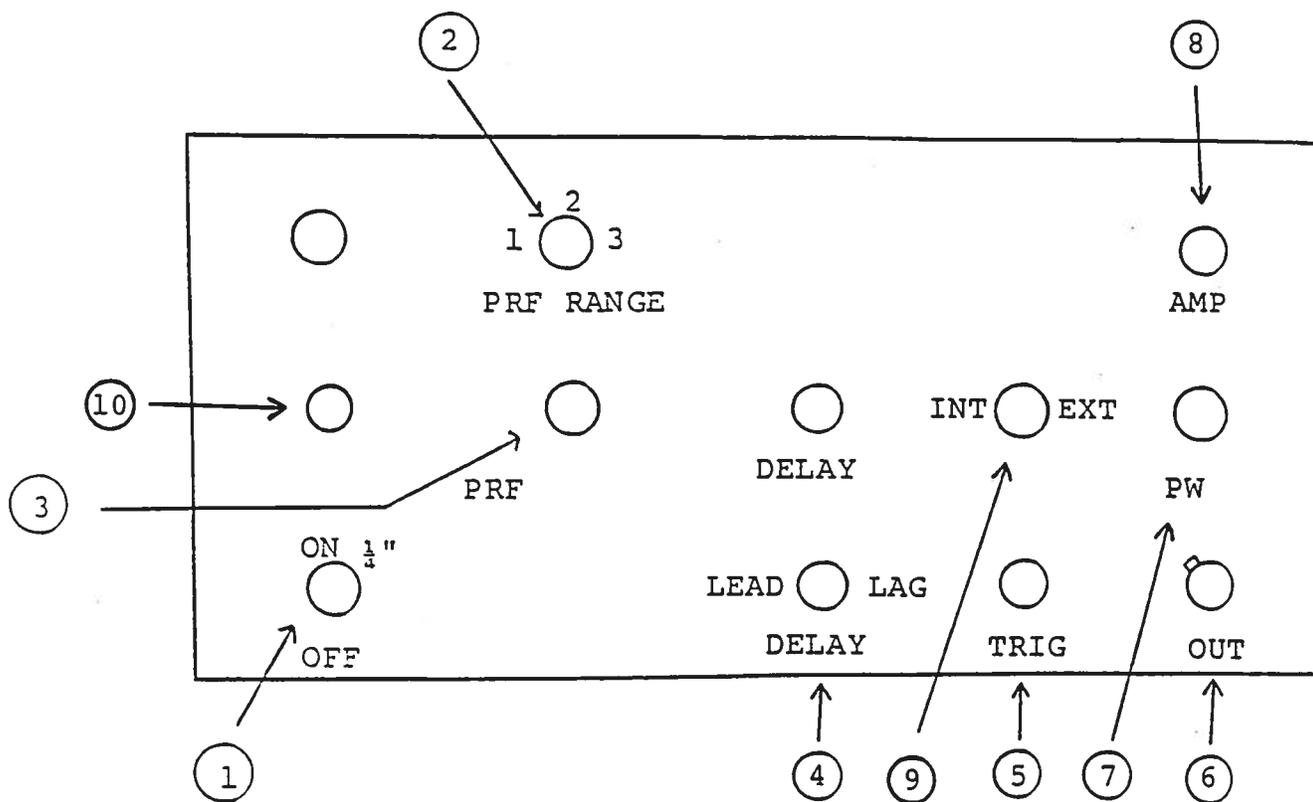
Notes:

- 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 use of 60 db attenuator at the scope vertical input channel will insure a peak input signal to the scope of less than one volt (necessary only if sampling scope used). If a high impedance real time scope is used, the pulse generator should be terminated using a shunt 50 ohm resistor.
- 3) The sync 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 SYNC output precedes the main output when the front panel LEAD-LAG switch is in the LEAD position. The SYNC output lags the main output when the switch is in the LAG position.
- 4) The mainframe generates an output pulse which is variable from 0 to +250 volts (to a high impedance). The UM1-M1 module transforms the pulse to 0 to +500 volts (to a high impedance). It is critically important that the length of 50 ohm cable between the mainframe and UM1-M1 module be as short as possible (one foot or less). Similarly the load capacitance presented to the UM1-M1 module must be extremely low. Load capacitance in excess of 10 pfd will result in noticeable increases of the rise and fall time. At high PRF (eg. 2 MHz) high load capacitance will result in overloading of the output stage. Note that when operating at the maximum PRF (2.0 MHz) the mainframe will become quite warm if operating over long periods of time (hours). It is therefore recommended that a small cooling fan be used to cool the mainframe.
- 5) To obtain a stable output display the PW control on the front panel should be set mid range while the PRF control should be set max counter clockwise (200 KHz). 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.
- 6) The output pulse width is controlled by means of the front panel one turn PW control.
- 7) The output pulse amplitude is controlled by means of the front panel one turn AMP control.

- 8) 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 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.
  
- 9) AVR-A-1-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. 2

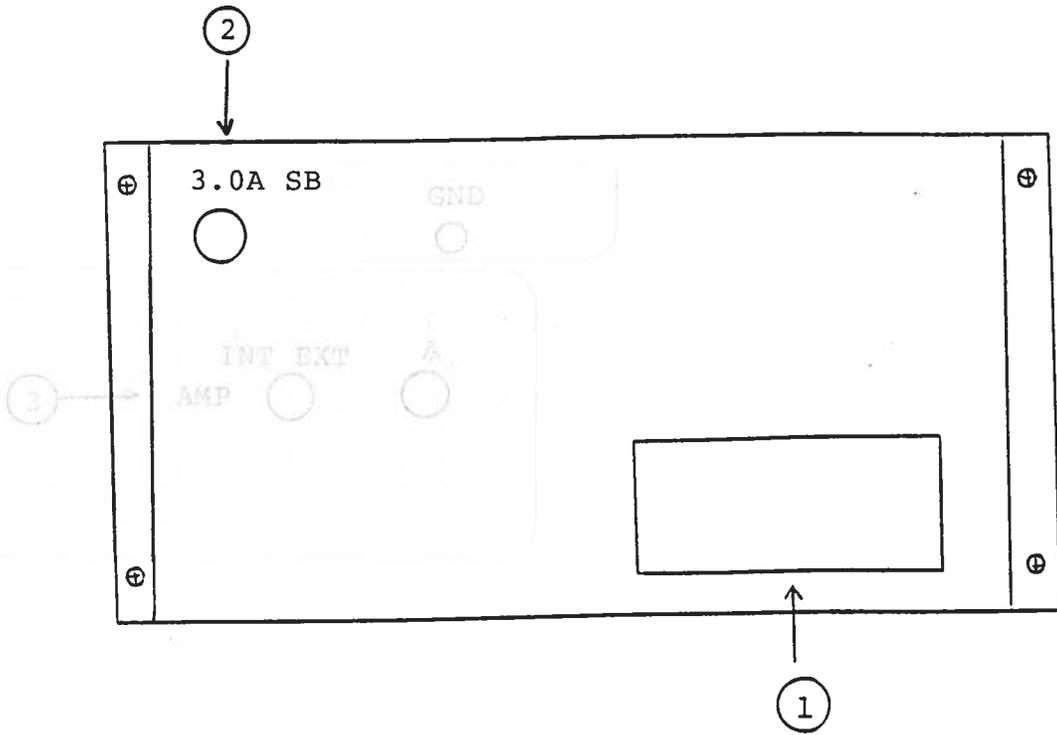
FRONT PANEL CONTROLS



- (1) ON-OFF Switch. Applies basic prime power to all stages.
- (2) PRF Control. Ranges 1, 2 & 3 are all identical and all provide 200 KHz to 2.0 MHz.
- (3) PRF Control. Ranges 1, 2 & 3 are all identical and all provide 200 KHz to 2.0 MHz.
- (4) DELAY Control. Controls the relative delay between the reference output pulse provided at the TRIG output (5) and the main output (6). This delay is variable over the range of 0 to about 1.0 usec. 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.
- (5) TRIG 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.
- (6) OUT Connector. SMA connector provides output to a high impedance load (0 to +250 volts).
- (7) PW Control. A one turn control which varies the output pulse width.
- (8) AMP Control. A one turn control which varies the output pulse amplitude from 0 to 250V to a high impedance load.
- (9) 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 and PRF FINE 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.
- (10) OVERLOAD INDICATOR. AVR-A-1-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)

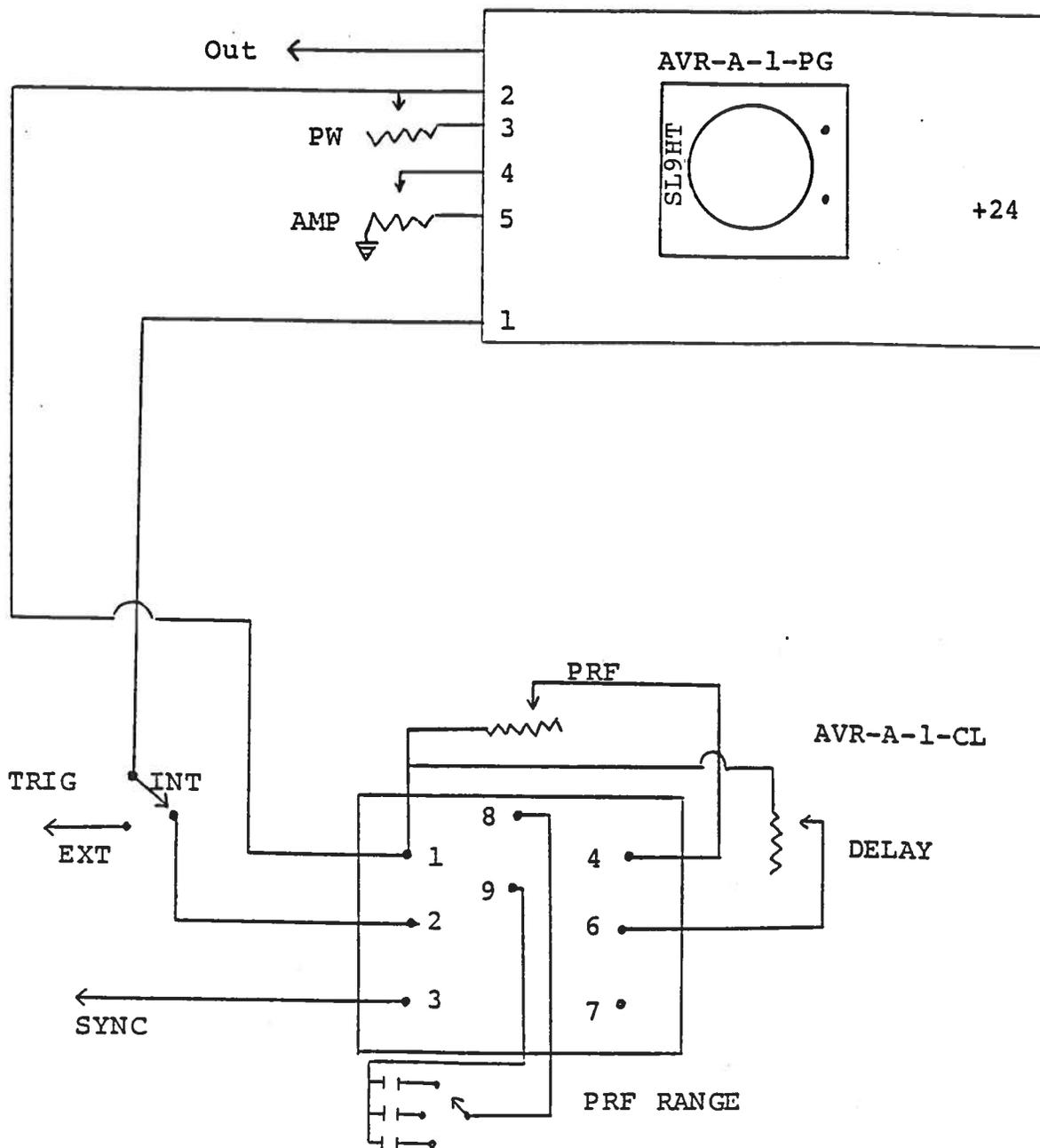
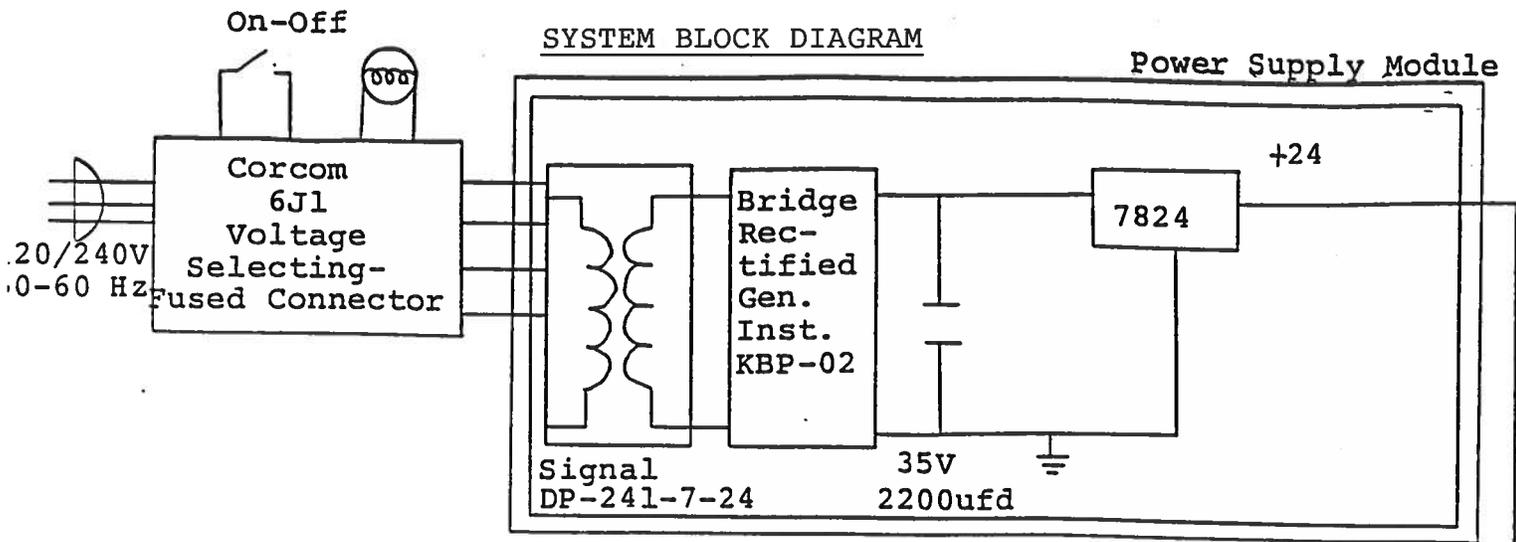
Fig. 3

BACK PANEL CONTROLS



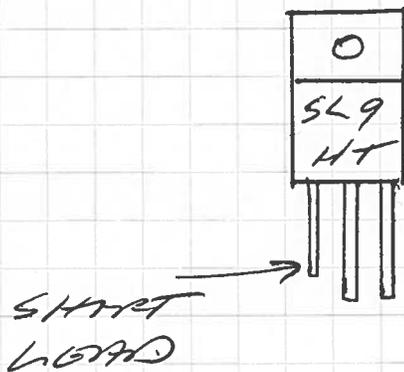
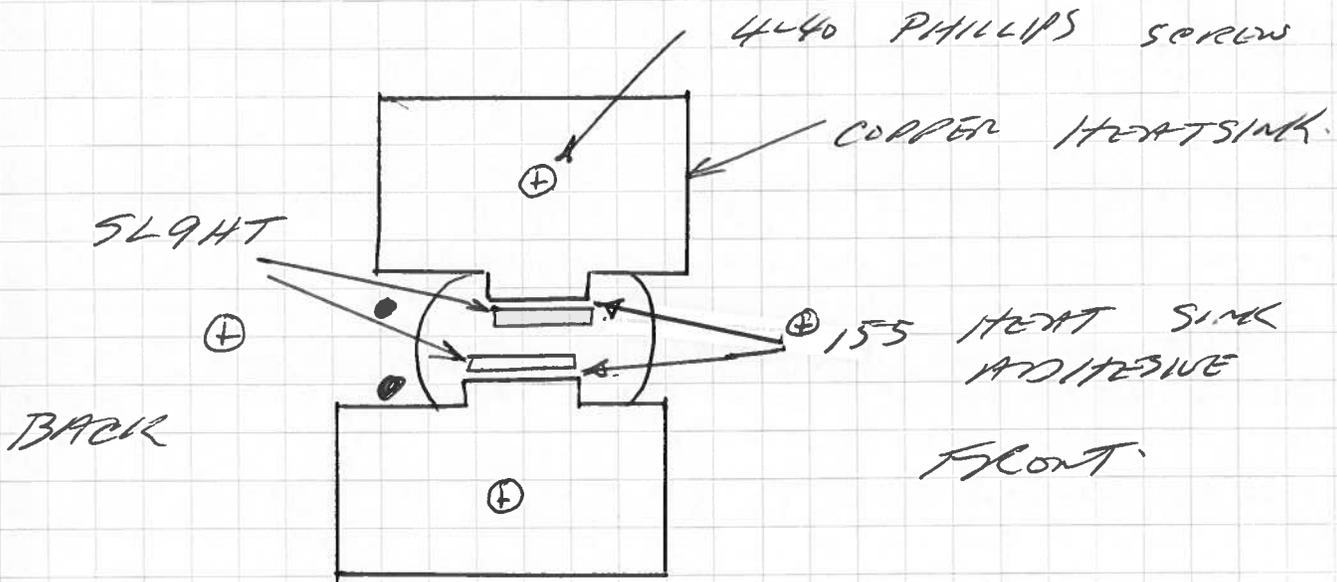
- (1) FUSED CONNECTOR, VOLTAGE SELECTOR. The detachable power cord is connected at this point. In addition, the removable cord is adjusted to select the desired input operating voltage. The unit also contains the main power fuse (1.0A SB).
- (2) 3.0 A SB. Fuse which protects the output stage if the output duty cycle rating is exceeded.

SYSTEM BLOCK DIAGRAM



APR-1-1-PW-C-UM1 SL9HT.

HEAT SINKING



## SYSTEM DESCRIPTION AND REPAIR PROCEDURE

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

- 1) AVR-A-1-PG pulse generator module
- 2) AVR-A-1-CL clock module
- 3) +24V power supply board

The modules are interconnected as shown in Fig. 4.

In the event of an instrument malfunction, it is most likely the rear panel 3.0 SB fuse has blown or that some of the output switching elements (SL9HT) 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 two 4-40 Phillips screws. NOTE: First turn off the prime power. CAUTION: Briefly ground the SL9HT tabs to discharge the 260 volts power supply potential. The elements may be removed from their sockets by means of a needle nosed pliers after removing the two 4-40 Phillips screws which attach the small copper heat sinks to the body of the -PG module. The SL9HT 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 SL9HT switching elements, take care to insure that the short lead (of the three leads) is adjacent to the black dot on the chassis. The SL9HT elements are electrically isolated from the small copper 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 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 200 KHz to 2 MHz 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.

Schroff

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