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INSTRUCTIONS

MODEL AVR-D2-C-SD1-SD2 PULSE GENERATOR

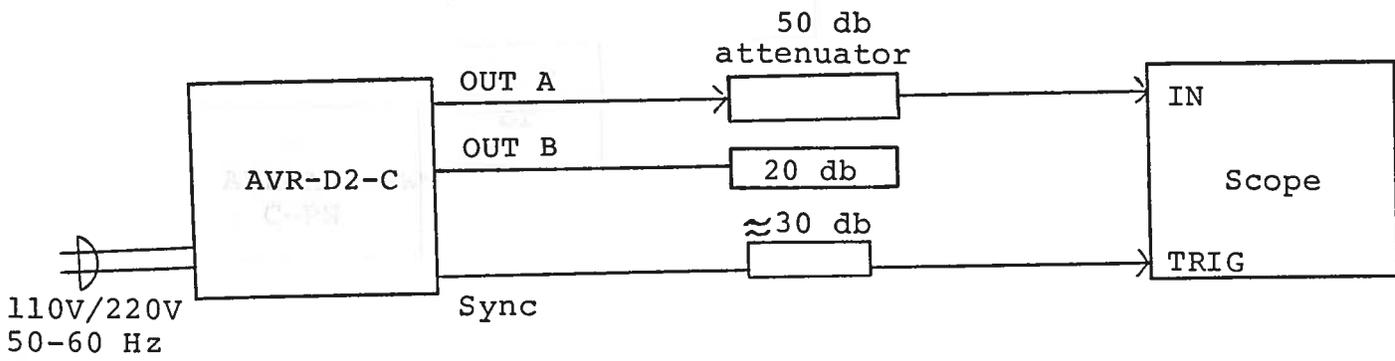
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WARRANTY

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 1000 MHz.
- 2) The use of 50 db attenuator (for channel A but 20 db for channel B) 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. Note that channel A and B both require 50 ohm termination when operating.
- 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 desired output polarity is selected by means of the front panel POLARITY switch.
- 5) 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.
- 6) The output pulse width for output A is controlled by means of the front panel ten turn PW A control. The pulse width for the B output is fixed at 15 nsec.
- 7) The output pulse amplitude for output A is controlled by means of the front panel ten turn AMP A control. The amplitude for the B output is fixed at 2 volts.
- 8) The DC offset to outputs A and B is controlled by the 10 turn front panel offset control and the two position offset ON-OFF switch. Note that the DC offset is zero for the pot control set near mid range while the offset magnitude is maximum for the pot fully CW or fully CCW.
- 9) 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.

10) CAUTION:

- a) Both outputs A and B are designed to operate into 50 ohms so the switching time test circuit should present an input resistance of this magnitude.
- b) At maximum duty cycle, output A will provide nearly 2 watts average power so the test circuit must be capable of dissipating this power.
- c) The DC offset on output A will provide up to 4.5 watts to a DC load of 50 ohms. It may be necessary to place DC blocking capacitors in the test circuit to limit the DC power dissipation.
- d) An audible hum may be evident when the DC offset is set near maximum for output A and the output pulse width is near maximum. This hum is normal.

11) SD2 option. Provides an extra 3 position switch accessible only in the interior of the instrument, which controls and relates PRF max and PW max as follows:

Position I: PRF and PW specification as per data sheet and controlled by front panel controls.

Position II: PRF max: 20 KHz
PW max: 2.5 usec

Front panel PRF range switch disabled but one turn PRF control is active. Front panel PW A and AMP A controls are active.

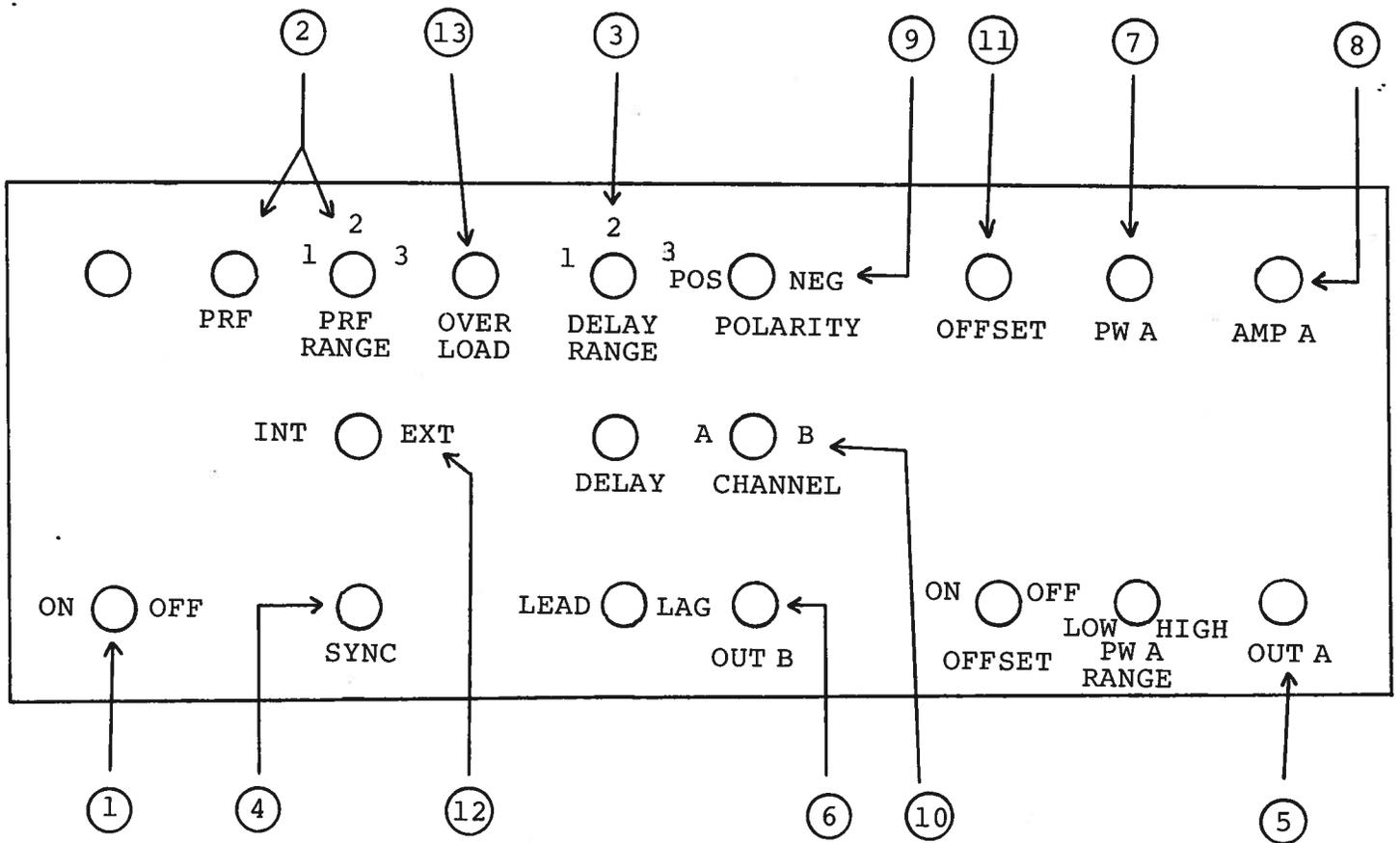
Position III: PRF max: 100 KHz
PW max: 200 nsec

Front panel PRF range switch disabled but one turn PRF control is active. Front panel PW A and AMP A controls are active.

The switch is accessed by removing the top cover of the instrument by removing the four Phillips screws on the back panel and then sliding the top cover back.

Fig. 2

FRONT PANEL CONTROLS



- (1) ON-OFF Switch. Applies basic prime power to all stages.
- (2) PRF Control. Controls PRF as follows:

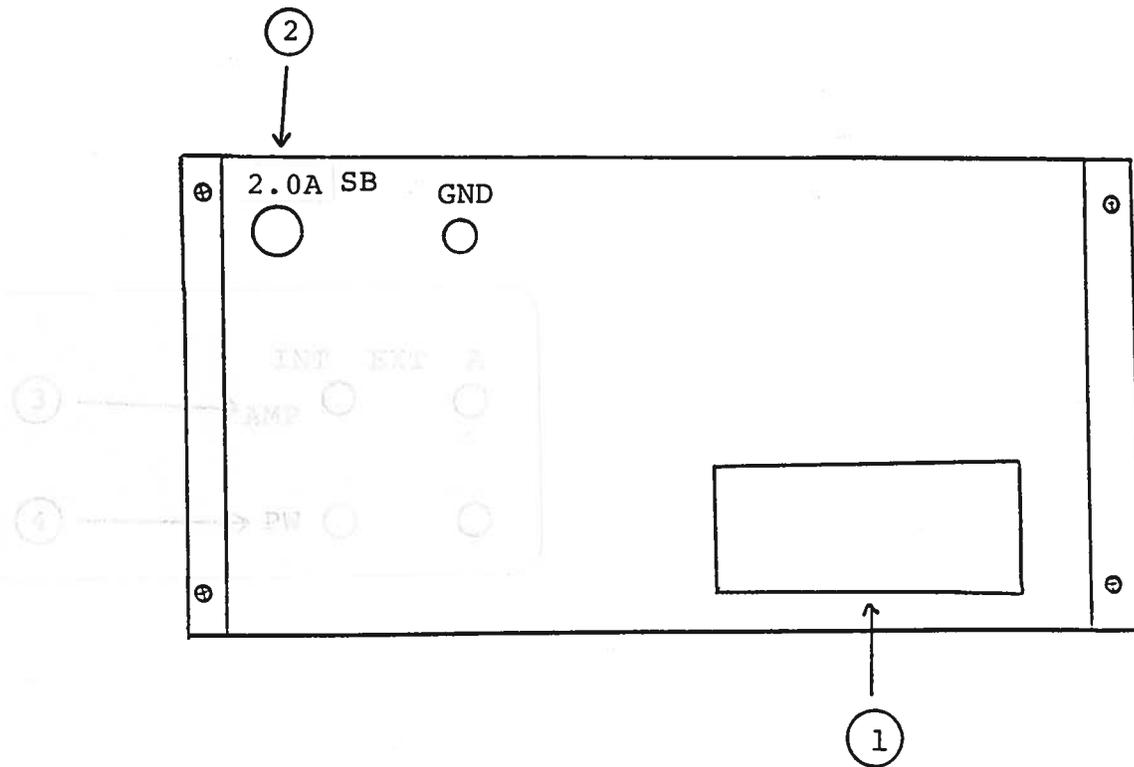
RANGE 1	20 Hz to 200 Hz
RANGE 2	200 Hz to 2 KHz
RANGE 3	500 Hz to 5 KHz
- (3) DELAY Control. Controls the relative delay between the reference output pulse provided at the SYNC output (4) and the main outputs (5) and (6). This delay is variable over the range of 0 to about 20.0 usec. The SYNC output 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 A Connector. BNC connector provides output to a fifty ohm load.
- (6) OUT B Connector. BNC connector provides output to a fifty ohm load.
- (7) PW A Control. A ten turn control and two position range switch which varies the output pulse width from 100 nsec to 20 usec.
- (8) AMP A Control. A one turn control which varies the output pulse amplitude from 0 to 30 V to a fifty ohm load.
- (9) POLARITY Control. Controls polarity of output pulse.
- (10) Channel selector. With two position switch in A position output A is active and output B is off. With switch in B position the output B is only active.
- (11) The DC offset to outputs A and B is controlled by the 10 turn front panel offset control and the two position offset ON-OFF switch. Note that the DC offset is zero for the pot control set near mid range while the offset magnitude is maximum for the pot fully CW or fully CCW. The max DC offset for channel A is 0 to ± 15 volts while the range for channel B is 0 to ± 1 volt.
- (12) 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 0.1 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.

- (13) OVERLOAD. If the output stages of the pulse generator are overloaded (eg. due to short circuit condition or high duty cycle) the overload protection circuit will turn all outputs off for 10 seconds and the indicator light will be on. If the overload condition is rectified, the outputs will turn on after 10 seconds and the light will go off. (This overload feature will be available only on units produced after July 1990. Units produced before this date will, however, have the indicator light in position on the front panel but the light will not operate).

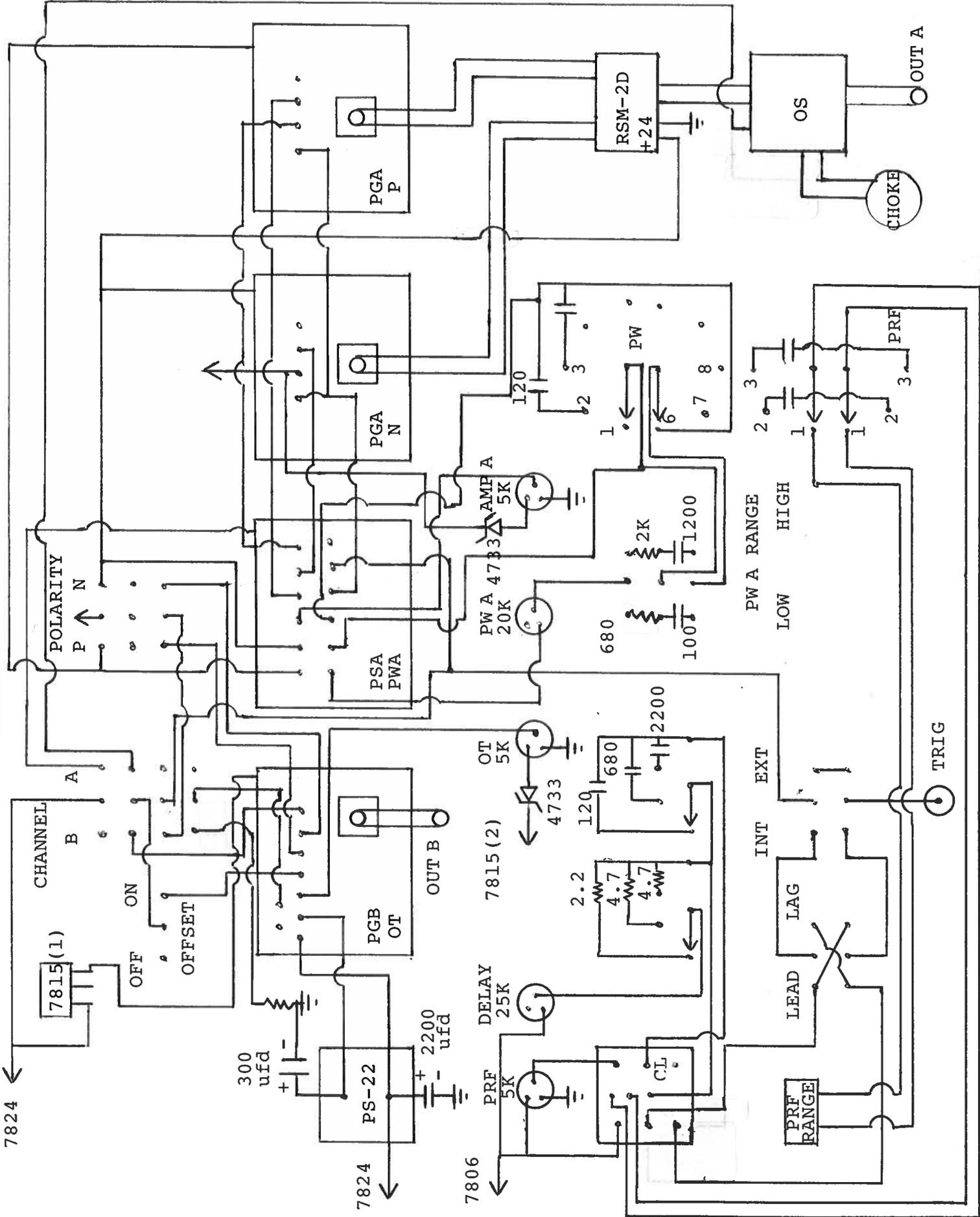
Fig. 3

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 (0.5A SB).
- (2) 2.0A SB. Fuse which protects the output stage if the output duty cycle rating is exceeded.

Fig. 4 AVR-D2-C-SD1-SD2



SYSTEM DESCRIPTION AND REPAIR PROCEDURE

The AVR-D2-C consists of the following basic modules:

- 1) AVR-D2-PG pulse generator modules (-P and -N)
- 2) AVR-D2-PSA-PWA power supply module
- 3) AVR-D2-PGB-OT pulse generator-offset module
- 4) AVR-D2-PS-22 power supply module
- 5) AVR-D2-OS offset module
- 6) AVR-D2-CL clock module
- 7) +24V power supply board

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 SYNC outputs. The PG pulse generator modules generate the output pulse. In the event of an instrument malfunction, it is most likely that the rear panel 2.0A 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 plates on the bottom side of the instrument. NOTE: First turn off the prime power. The elements may be removed from their sockets by means of a needle nosed pliers. The SL5T is a selected VMOS power transistor in a TO 220 packages 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 black dot on the chassis. 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 should be 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 5 KHz using the PRF controls.
- c) The relative delay between the pin 2 and 3 outputs can be varied by at least 20 usec by the DELAY controls.

The sealed clock module must be returned to Avtech for repair or replacement if the above conditions are not observed. The power supply board generates +24V DC to power the other modules. If the voltage is less than +24V, turn off the prime power and unsolder the lead from the 7824 regulator chip on the power supply board. Solder a 100 ohm 5 watt resistor to the 7824 output to ground and turn on the prime power. A voltage of +24 volts should be read. If the voltage is less then the power supply board is defective and should be repaired or replaced.

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