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INSTRUCTIONS

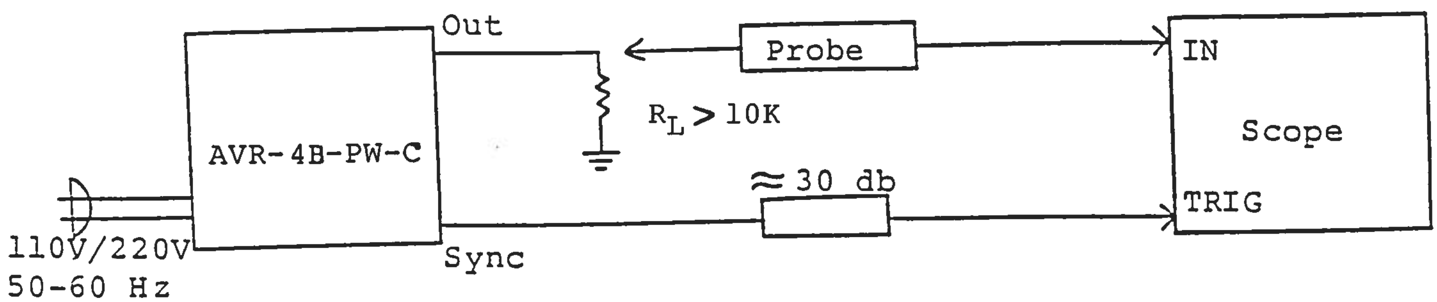
MODEL AVR-4B-PW-C-P-TECH1 PULSE GENERATOR

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 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 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.

The DELAY control controls the relative delay between the reference output pulse provided at the TRIG output and the main output. This delay is variable over the range of 0.1 usec to 10 usec.

	MIN	MAX
Range 1	0.1 usec	1.0 usec
Range 2	1.0 usec	10 usec

3) The output pulse width is controlled by means of the front panel one turn PW control and by the PW RANGE control.

	PW MIN	PW MAX
Range 1	50 nsec	1.0 usec
Range 2	1.0 usec	10 usec

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 ($R_{IN} \geqslant$ 10K). (option).

4) To obtain a stable output display the PRF control 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 and PRF FINE controls.

5) 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 ($R_{IN} \geqslant$ 10K). (option).

6) 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 TRIG output.

7) 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 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, i.e. operate in a low PRF range when possible rather than in a high PRF range.
   b) Keep the output PW to a minimum.

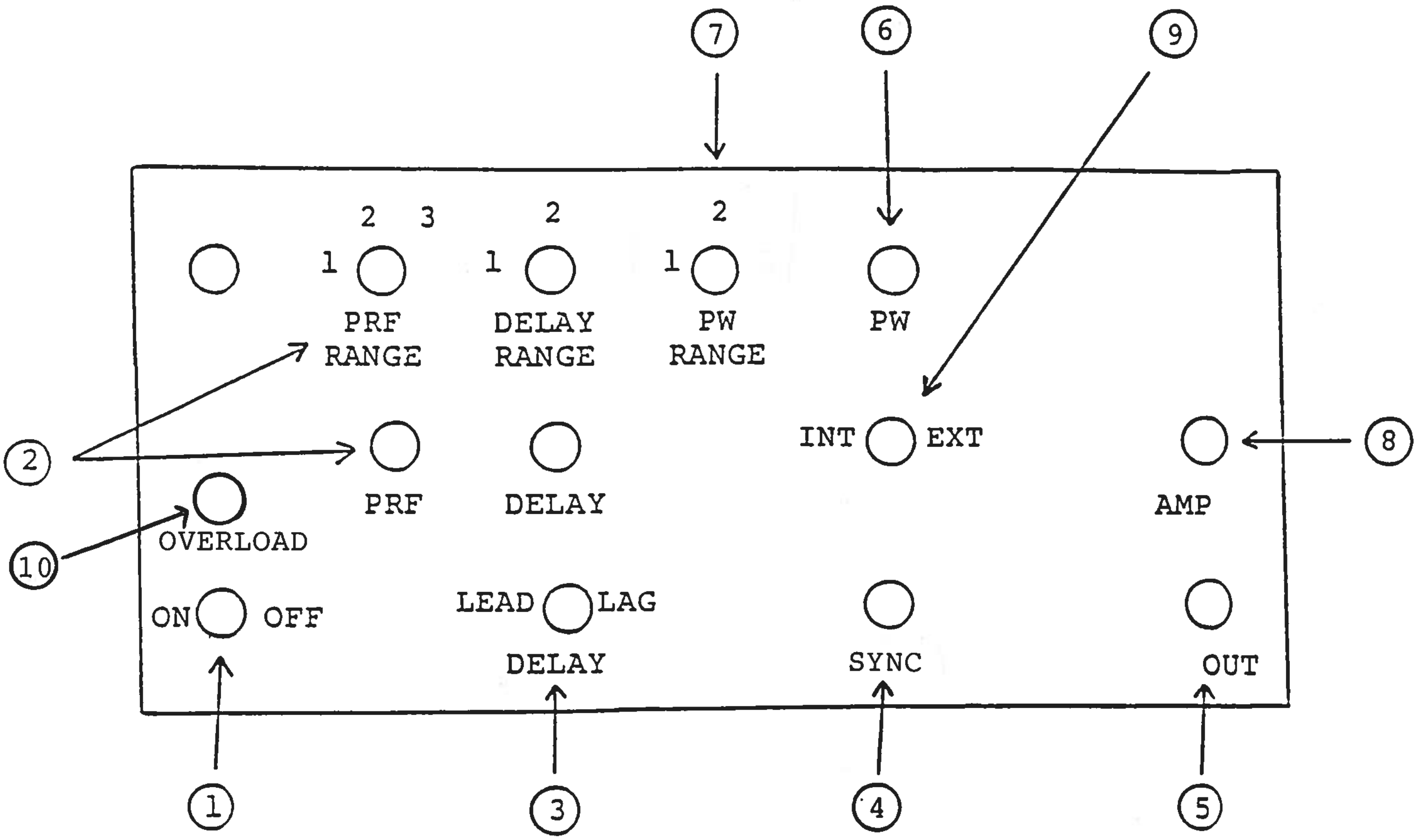
8) OVERLOAD INDICATOR. AVR units with a serial number higher than 5600 are protected by an automatic overload protective circuit which controls the front panel overload light. If the unit is overloaded (by operating at an exceedingly high duty cycle or by operating into a short circuit), the protective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

9) 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) ON-OFF Switch. Applies basic prime power to all stages.

(2) PRF Control. Varies PRF from 0.1 Hz to 1 KHz as follows:

Range 1	5 Hz	50 Hz
Range 2	20 Hz	200 Hz
Range 3	100 Hz	1 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 100 usec. Delay LEADS or LAGS depending on the position of the LEAD-LAG switch.

	MIN	MAX
Range 1	0.1 usec	1.0 usec
Range 2	1.0 usec	10 usec

(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. This output precedes the output at (5) if the two position LEAD-LAG switch is in the LEAD position. This output follows the output at (5) if the switch is in the LAG position. The delay range is variable from 0.1 usec to 10 usec. The external trigger signal is applied at this input when the EXT-INT toggle switch is in the EXT position.

(5) OUT Connector. SHV connector provides output to a HIGH IMPEDANCE load (R_L > 10K).

(6)
(7) PW Control. A one turn control and 2 position range switch which varies the positive output pulse width from 50 nsec to 10 usec.

	PW MIN	PW MAX
Range 1	0.1 usec	1.0 usec
Range 2	1.0 usec	10 usec

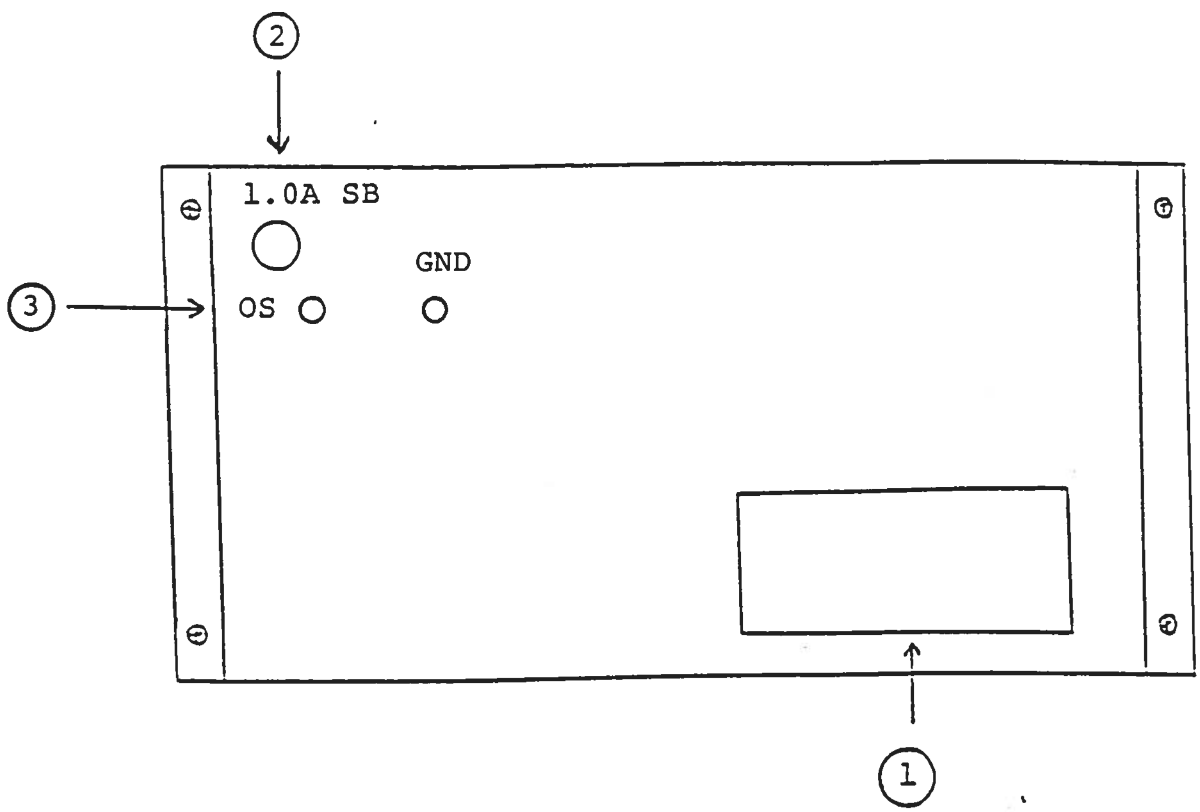
(8) AMP Control. A one turn control which varies the output pulse amplitude from 0 to 400 V.

(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 control. With the toggle switch in the EXT position, the AVR unit requires a 0.2 usec TTL level pulse applied at the SYNC 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 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)

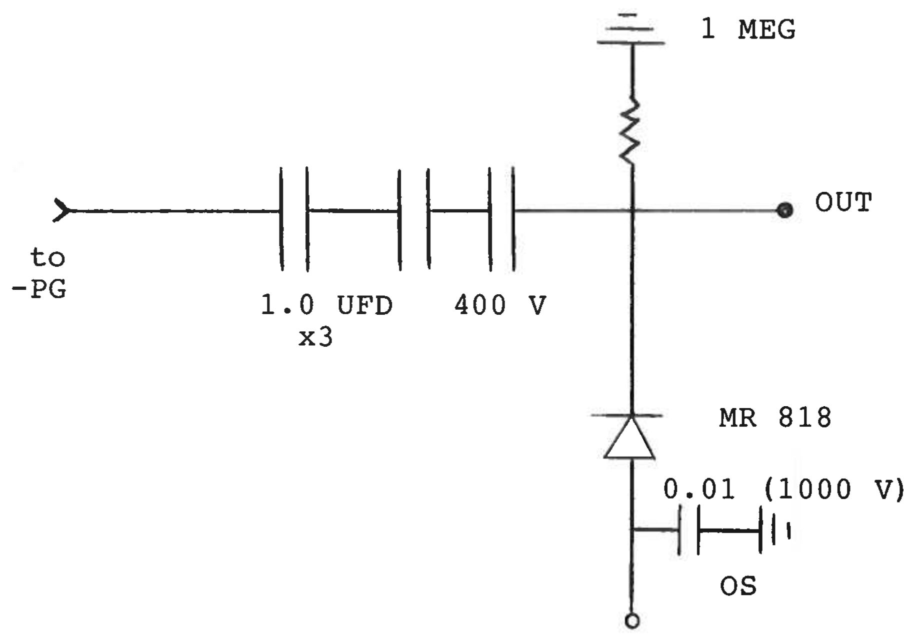
Fig. 3 BACK PANEL CONTROLS



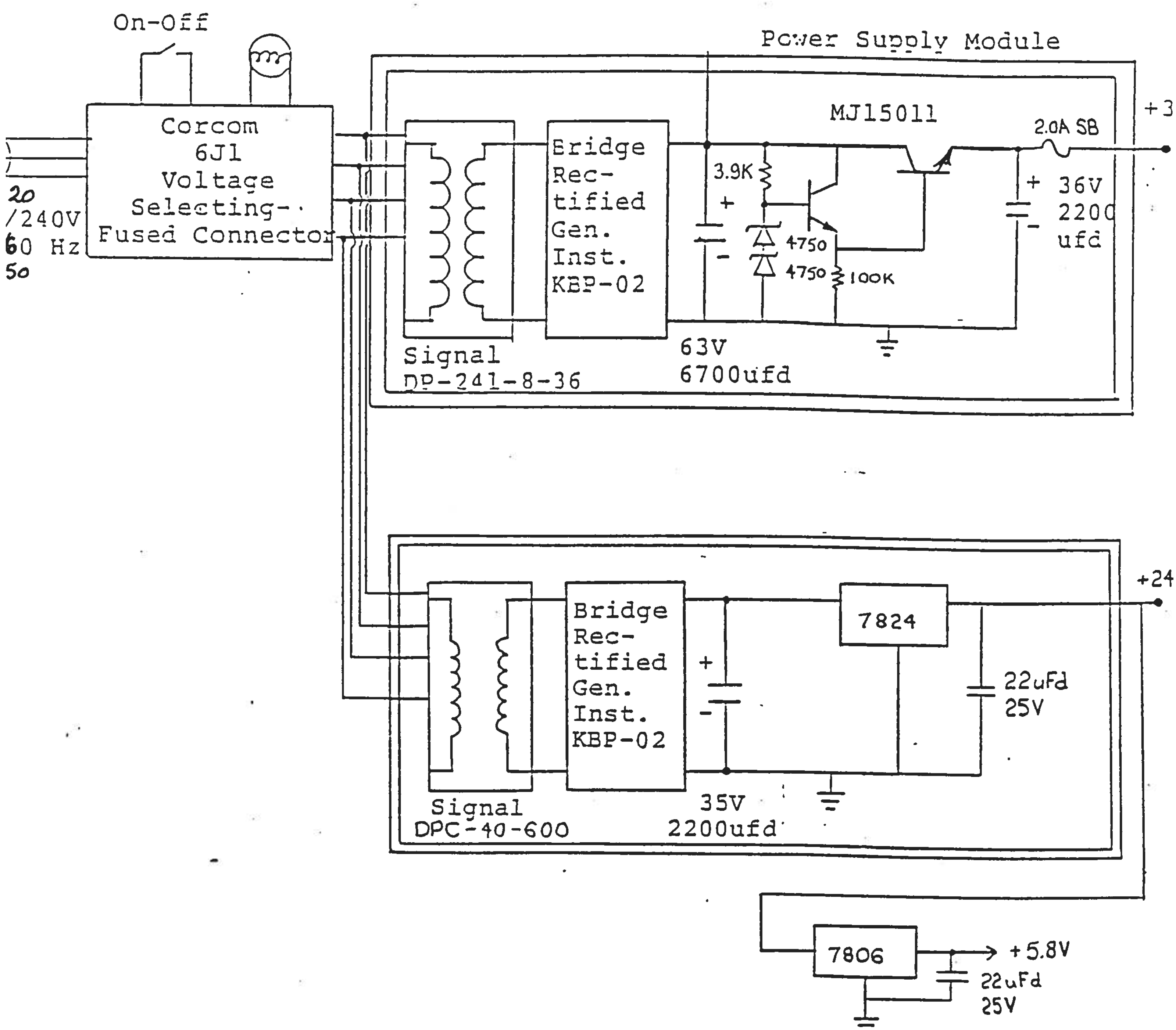
(1) FUSED CONNECTOR, VOLTAGE SELECTOR. The detachable power cord is connected at this point. In addition, the removable cord is adjusted to select the desired input operating voltage. The unit also contains the main power fuse (0.5 A SB).

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

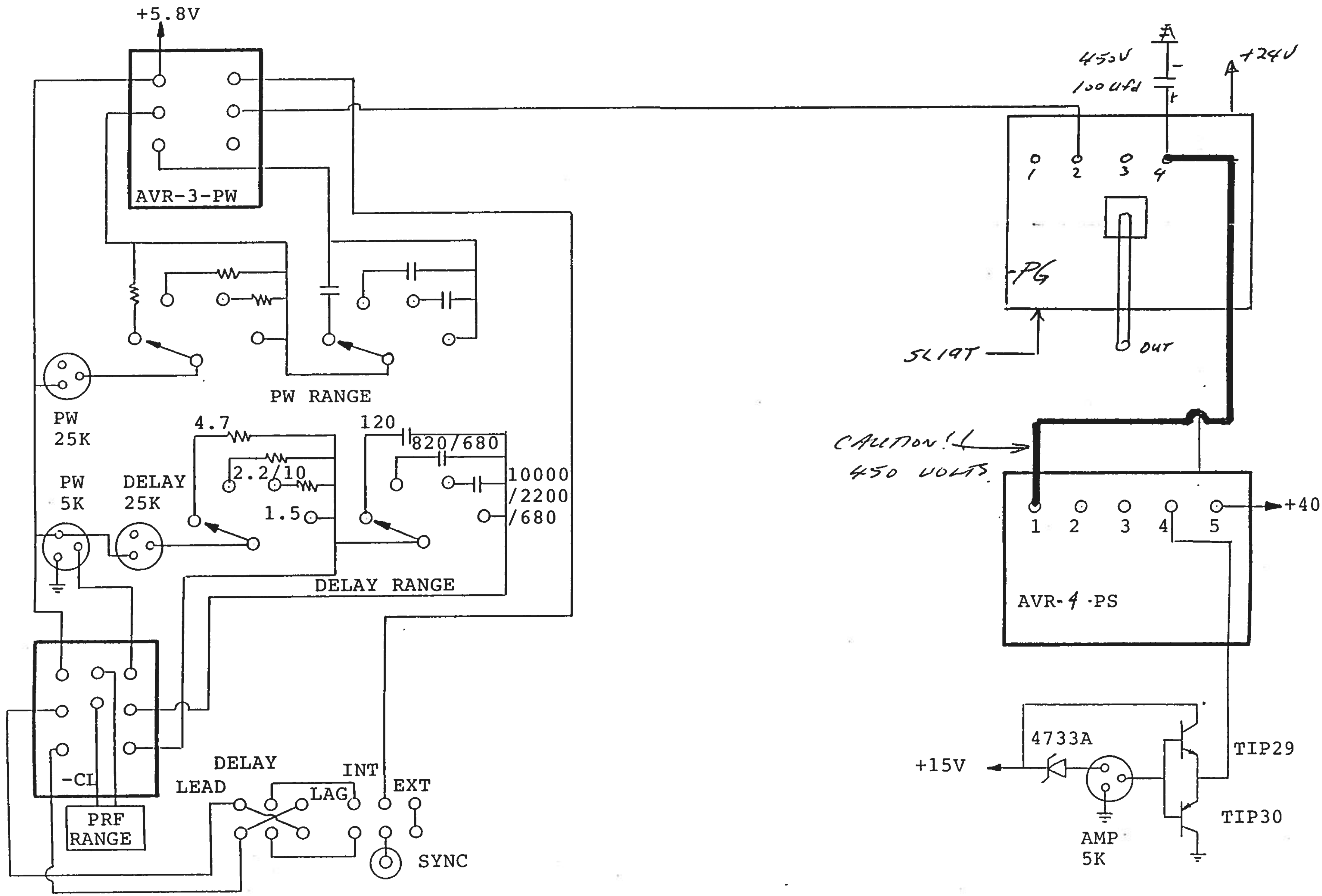
(3) OS. To apply a positive DC offset to the output pulse, apply the desired DC offset potential to the OS solder terminals ($V_{MAX} \leqslant$ 1000 volts). The circuit for the offset unit is as follows:



POWER SUPPLY



AVR-4B-PW-C


+5.8V
AVR-3-PW
PW RANGE
PW
25K
PW
5K
DELAY
25K
4.7
2.2/10
1.5
120
820/680
10000
/2200
/680
DELAY RANGE
-CL
PRF
RANGE
DELAY
LEAD
LAG
INT
EXT
SYNC
450V
100ufd
+24V
1 2 3 4
PG
OUT
SLIGT
CAUTION!!
450 VOLTS.
1 2 3 4 5
+40
AVR-4-PS
4733A
+15V
AMP
5K
TIP29
TIP30

SYSTEM DESCRIPTION AND REPAIR PROCEDURE

The AVR-4-PW-C-PN consists of the following basic modules.

1) AVR-4-PW-PG pulse generator module
2) AVR-4-CL clock module
3) +36V, +24V, +5.8V power supply board
4) AVR-4-PS power supply module
5) AVR-4-PW pulse width 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 top 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.). 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 10 HZ to 1 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.

Schroff 04.02.91

- EW

- EA

- OS