

# AVTECH ELECTROSYSTEMS LTD.

NANOSECOND WAVEFORM ELECTRONICS  
ENGINEERING - MANUFACTURING

P.O. BOX 265  
OGDENSBURG  
NEW YORK  
13669  
(315) 472-5270

BOX 5120, STN. "F"  
OTTAWA, ONTARIO  
CANADA K2C 3H4  
TEL: (613) 226-5772  
FAX: (613) 226-2802  
TELEX: 053-4591

## INSTRUCTIONS

MODEL AVR-3-C-PW-FN-C-TRCFC-EA-EW-EF-TPN PULSE GENERATOR

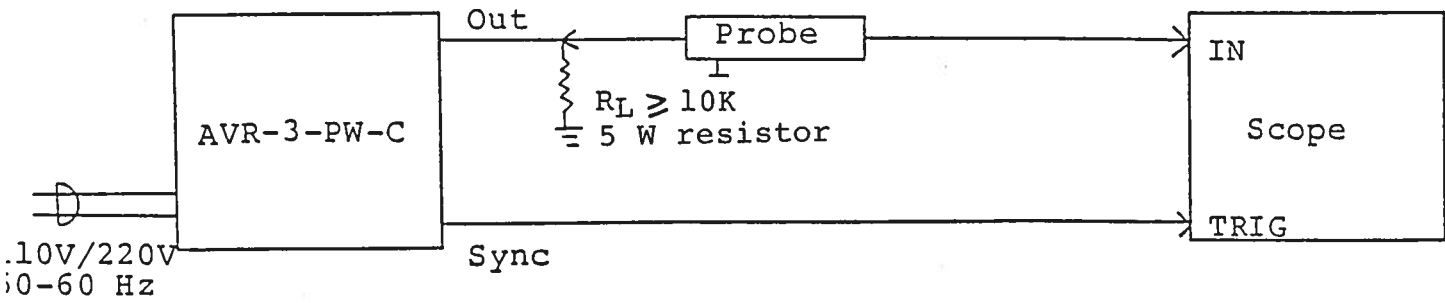
S.N.:

## 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



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 ( $R_L > 100K$ ). The unit may fail if operated into low impedance loads (eg.  $50 \Omega$ ).
- 3) The sync output channel provides TTL level signals. 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.

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 0.01 usec to 10 msec.

	MIN	MAX
Range 1	0.01 usec	0.1 usec
Range 2	0.1 usec	1.0 usec
Range 3	1.0 usec	10 usec
Range 4	10 usec	0.1 msec
Range 5	0.1 msec	1 msec
Range 6	1 msec	10 msec

- 4) The output pulse widths for the positive and negative swings are 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 the above (50%).

	PW min	PW max
Range 1	10 usec PRF max 5 KHz	100 usec PRF max 5 KHz
Range 2	100 usec PRF max 5 KHz	1 msec PRF max 0.5 KHz
Range 3	1 msec PRF max 0.5 KHz	10 msec PRF max 50 Hz

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).

- 5) The output pulse amplitudes for the positive and negative swings are 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).
- 6) The TPN controls determine the time interval between the positive and negative voltage swings as follows.

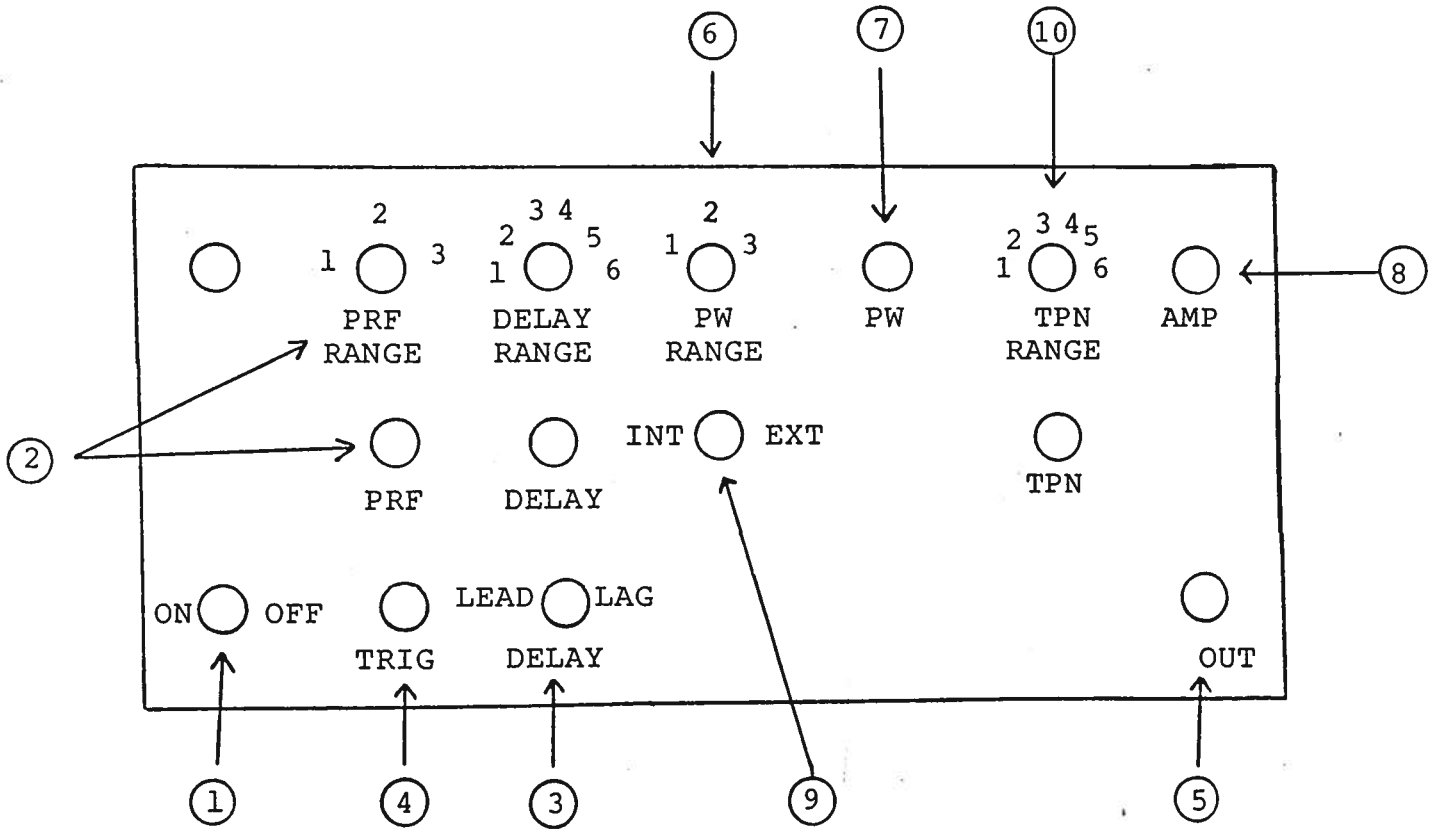
	MIN	MAX
Range 1	0.02 usec	0.2 usec
Range 2	0.2 usec	2 usec
Range 3	2 usec	20 usec
Range 4	20 usec	200 usec
Range 5	200 usec	2 msec
Range 6	2 msec	20 msec

Note that to avoid distortion of the output pulses, the delay time TPN should be less than  $T-2PW$ .

- 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 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.

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 to 50 Hz
Range 2	50 Hz to 500 Hz
Range 3	500 Hz to 5 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 10 msec. Delay LEADS or LAGS depending on the position of the LEAD-LAG switch.

	MIN	MAX
Range 1	0.01 usec	0.1 usec
Range 2	0.1 usec	1.0 usec
Range 3	1.0 usec	10 usec
Range 4	10 usec	0.1 msec
Range 5	0.1 msec	1.0 msec
Range 6	1.0 msec	10 msec

- (4) 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. 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 0.01 usec to 10 msec. 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 (>10K).
- (6) PW Control. A one turn control and 3 position range switch which varies the output pulse width from 10 usec to 10 msec. 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 the above.
- (7)

	PW min	PW max
Range 1	10 usec PRF max 5 KHz	100 usec PRF max 5 KHz
Range 2	100 usec PRF max 5 KHz	1 msec PRF max 0.5 KHz
Range 3	1 msec PRF max 0.5 KHz	10 msec PRF max 50 Hz

(8) AMP Control. A one turn control which varies the output pulse amplitude from 0 to  $\pm 220$  V 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 control. 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) TPN Control.

The TPN controls determine the time interval between the positive and negative voltage swings as follows.

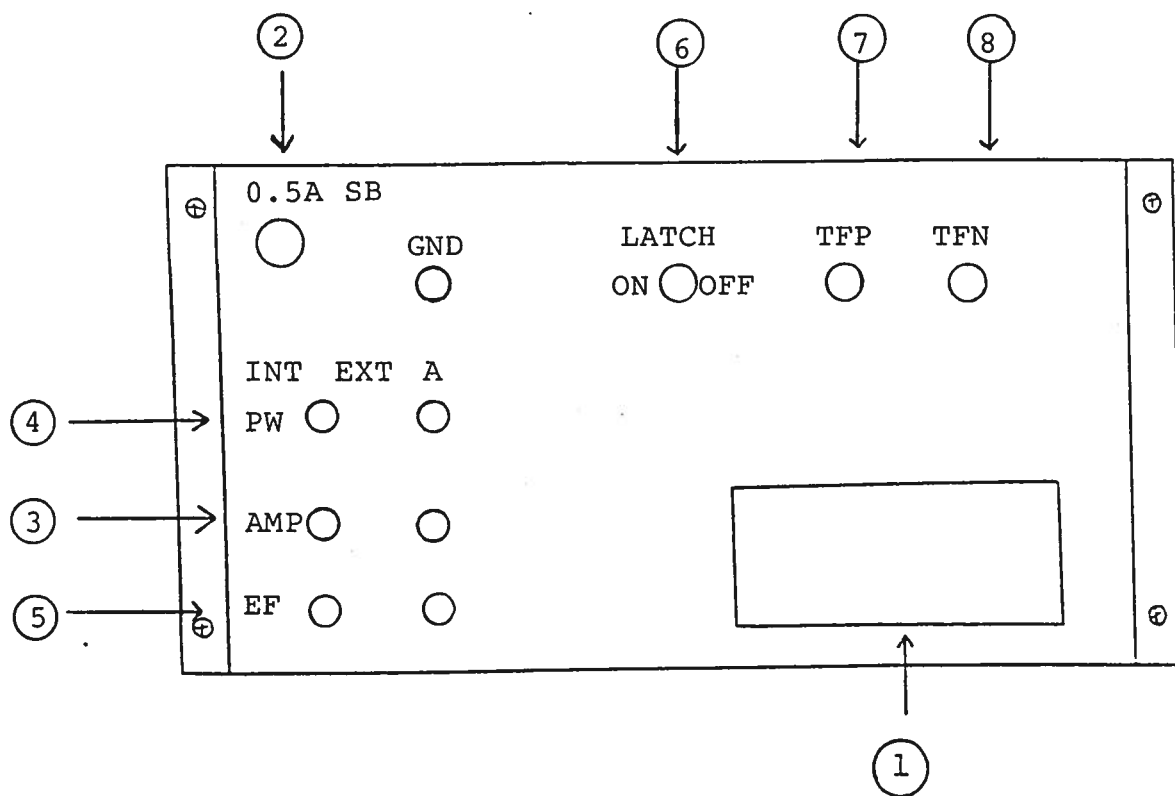
	MIN	MAX
Range 1	0.02 usec	0.2 usec
Range 2	0.2 usec	2 usec
Range 3	2 usec	20 usec
Range 4	20 usec	200 msec
Range 5	200 msec	2 msec
Range 6	2 msec	20 msec

Note that to avoid distortion of the output pulses, the delay time TPN should be less than  $T-2PW$ .



Fig. 3

BACK PANEL CONTROLS



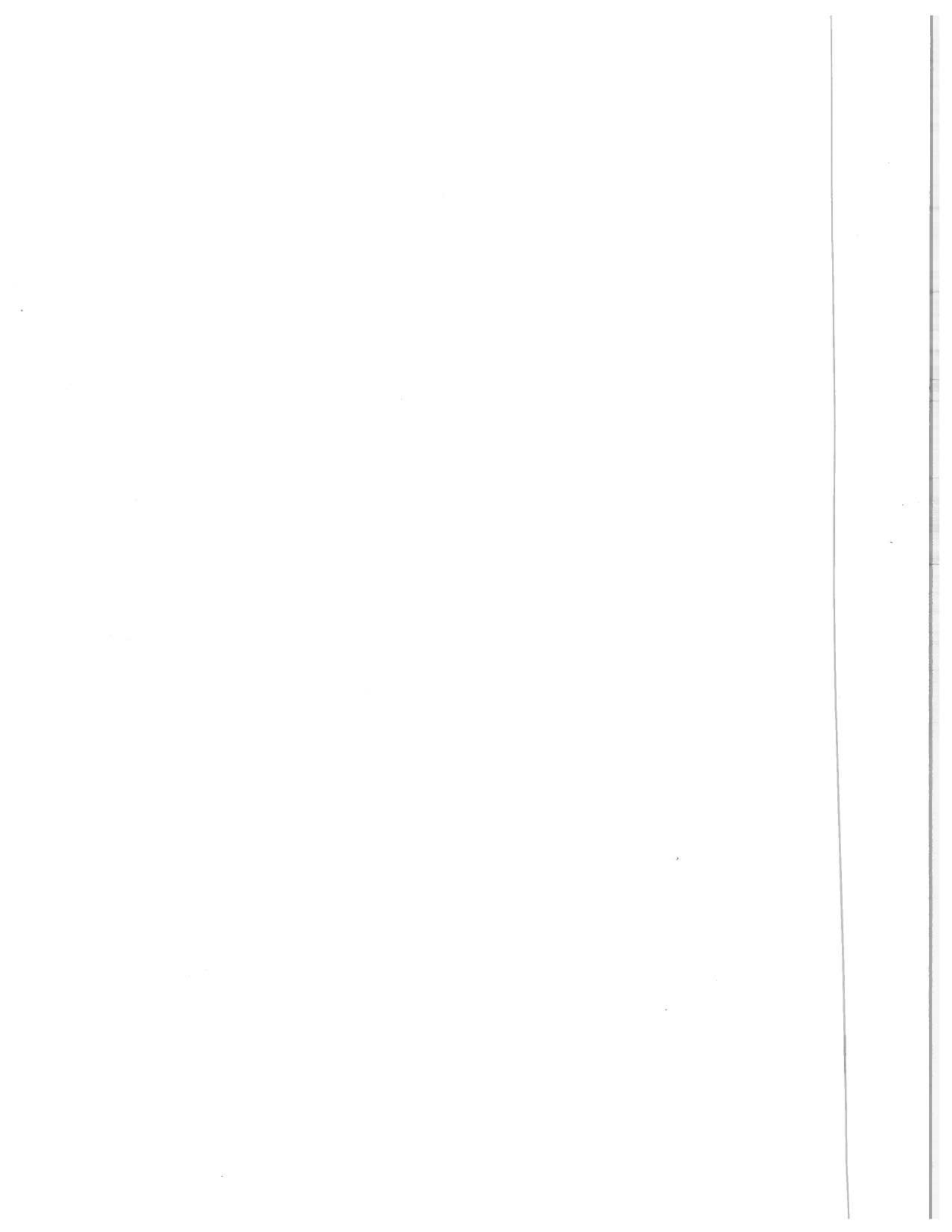
- (1) FUSED CONNECTOR, VOLTAGE SELECTOR. The detachable power cord is connected at this point. In addition, the removable cord is adjusted to select the desired input operating voltage. The unit also contains the main power fuse (0.5A 5B).
- (2) 1.0A 5B. Fuse which protects the output stage if the output duty cycle rating is exceeded.
- (3) EA. To voltage control the output amplitude, set the switch in the EXT position and apply 0 to +10 volts between terminal A and ground ( $R_{IN} > 10K$ ). (option).
- (4) EW. To voltage control the output pulse width, (within each range) switch in the EXT position and apply 0 to +10 volts between terminal A and ground  $R_{IN} > 10K$ . (option).
- (5) EF. To voltage control the output frequency (within each range), set the switch in the EXT position and apply 0 to +10 volts between terminal A and ground ( $R_{IN} > 10K$ ). (option).
- (6) LATCH. Two position switch which disables front panel PW control when placed in ON position (ie LOCKS PW in last position). For some PW settings there may be more pulse width jitter evident. This jitter may be removed by placing the latch switch in the ON position.
- (7) TFP, TFN POTS. Controls slope of following edge on positive and negative swing. Pots set at factory and should not require additional adjustment.

## SYSTEM DESCRIPTION AND REPAIR PROCEDURE

The AVR-3-PW-C-PN-TRCFC consists of the following basic modules:

- 1) AVR-3-PW-PG pulse generator module
- 2) AVR-3-CL clock module
- 3) +24V power supply board
- 4) AVR-3-PS power supply module
- 5) AVR-3-PW pulse width module
- 6) AVR-PS-5.0 power supply module

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 (SL21T) 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. The cover plate is removed by removing the two 2-56 Phillips screws. NOTE: First turn off the prime power. CAUTION: Briefly ground the SL21T tabs to discharge the 220 volts power supply potential. The elements may be removed from their sockets by means of a needle nosed pliers. The SL21T 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 SL21T switching elements, take care to insure that the short lead (of the three leads) is adjacent to the back of the chassis.



POWER SUPPLY

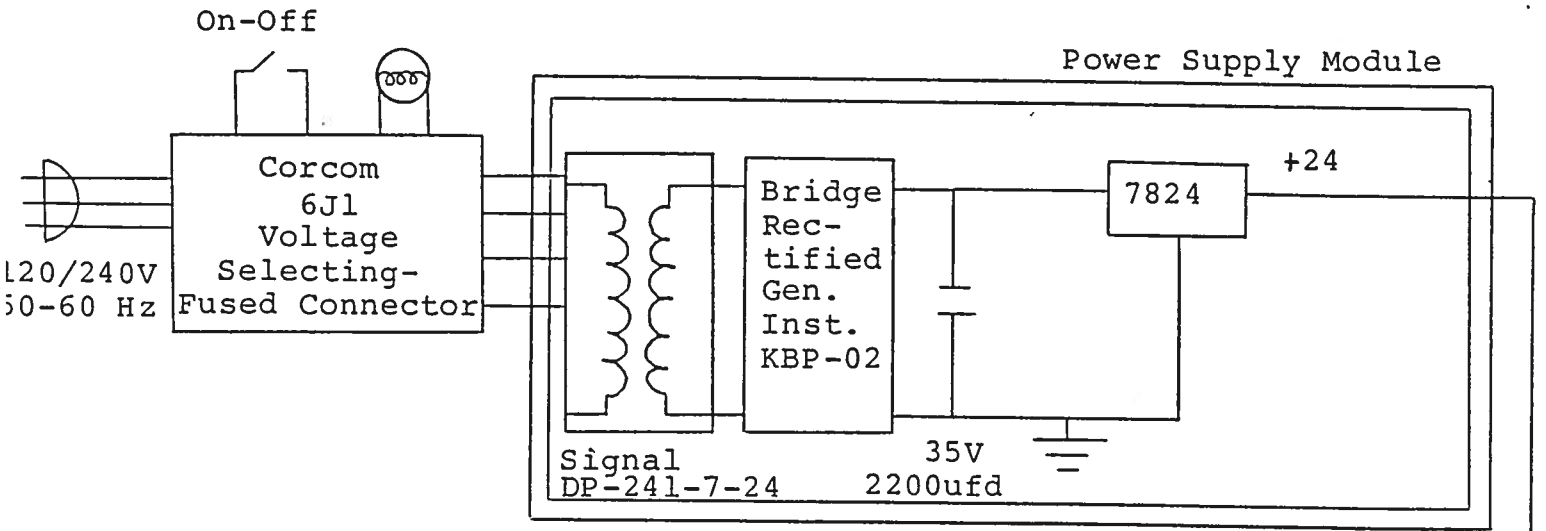


Fig. 3b

08.30.90

-EA  
-EW  
-EF