



AVTECH ELECTROSYSTEMS LTD.
NANOSECOND WAVEFORM ELECTRONICS

P.O. BOX 265
OGDENSBURG, NY
U.S.A. 13669-0265
TEL: (315) 472-5270
FAX: (613) 226-2802

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

INSTRUCTIONS

MODEL AVR-E3-W-C-P-ATT1 PULSE GENERATOR

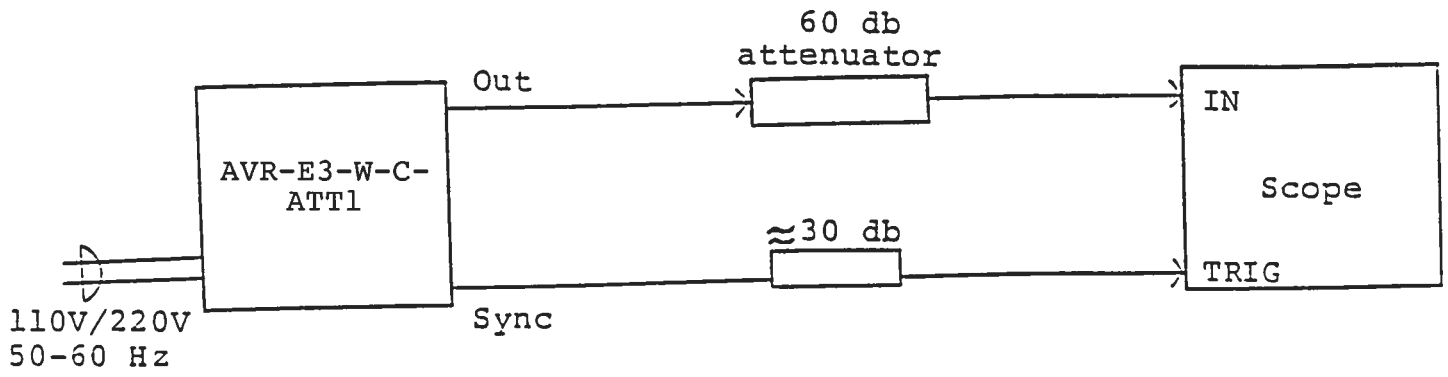
S.N. :

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 500 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 output pulse width is controlled by the ten turn PW control and the 3 position range switch as follows. The max allowable PRF for each range is also shown:

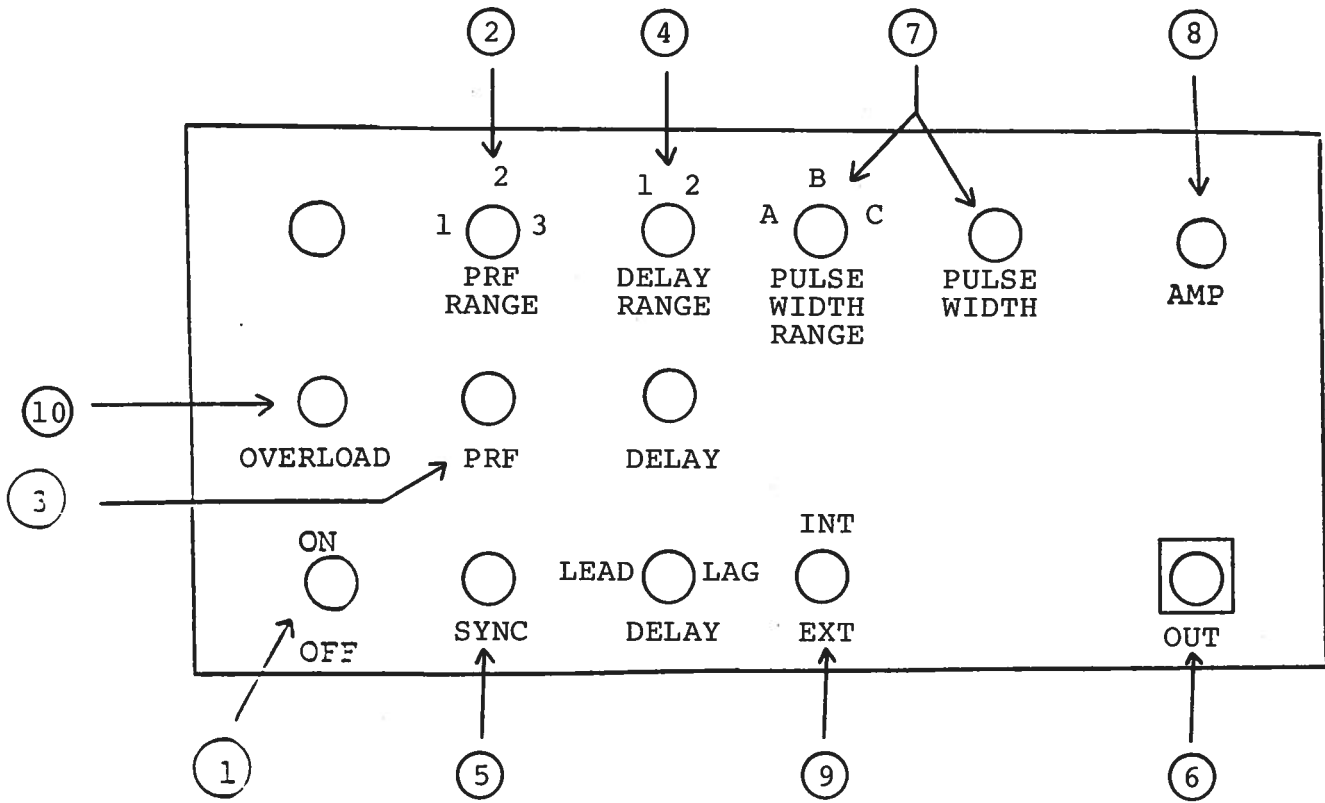
	PW	PRF
Range A:	2 ns to 6 ns	0 to 10 kHz
Range B:	6 ns to 100 ns	0 to 10 kHz
Range C:	100 ns to 1 us	0 to 10 kHz

- 5) The output amplitude is controlled by the ten turn AMP control. Note that when the pulse width range is changed (eg. from A to B), the output amplitude will change.
- 6) Note that when the pulse width range is changed (eg. from A to B), the output amplitude may also change. Also, the propagation delay will also change. The propagation delays for the three ranges are approximately as follows:
 - A) 100 ns
 - B) 250 ns
 - C) 100 ns
- 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 us (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.

- 8) 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.
- 10) For additional assistance, call (613) 226-5772 or Fax (613) 226-2802.

Fig. 2

FRONT PANEL CONTROLS



- (1) ON-OFF Switch. Applies basic prime power to all stages.
- (2) PRF Control. Varies PRF from 10 Hz to 10 kHz as follows:
- (3)

Range 1	10 Hz	100 Hz
Range 2	100 Hz	to 1.0 kHz
Range 3	1.0 kHz	to 10 kHz
- (4) DELAY Control. Controls the relative delay between the reference output pulse provided at the SYNC output (5) and the main output (6). This delay is variable over the range of 0 to about 1.0 us (Range 1) or 1.0 to 5.0 us (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.
- (5) SYNC Output. This output is used to trigger the scope time base. The output is a TTL level 100 ns (approx.) pulse capable of driving a fifty ohm load.
- (6) OUT Connector. SMA connector provides output to a fifty ohm load.
- (7) PW Controls. The output pulse width is controlled by the ten turn PW control and the 3 position range switch as follows:

	PW	PRF
Range A:	2 ns to 6 ns	0 to 10 kHz
Range B:	6 ns to 100 ns	0 to 10 kHz
Range C:	100 ns to 1 us	0 to 10 kHz

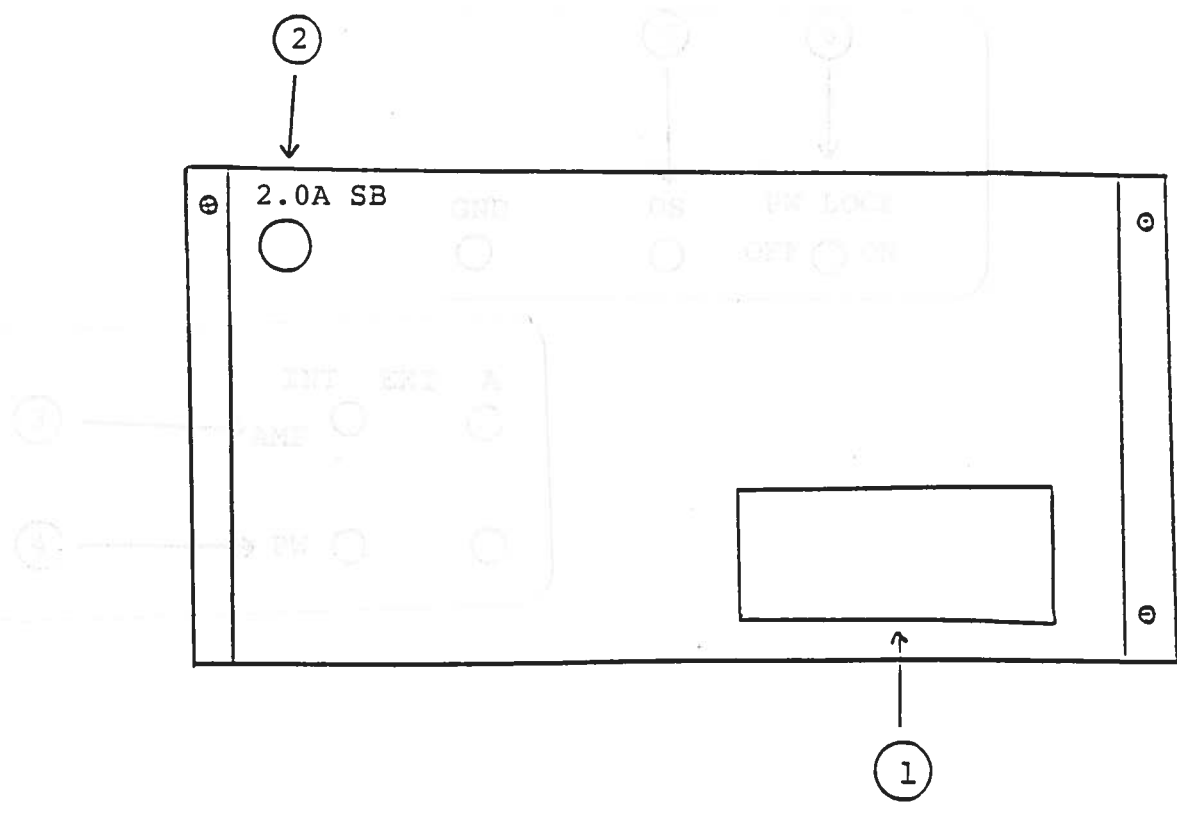
- (8) AMP Control. The output amplitude (for all three ranges) is controlled by this 10 turn amplitude control.
- (9) EXT-INT Control. With this toggle switch in the INT position, the PRF of the AVR unit is controlled via an internal clock which in turn is controlled by the PRF and PRF FINE controls. With the toggle switch in the EXT position, the AVR unit requires a 0.2 us 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

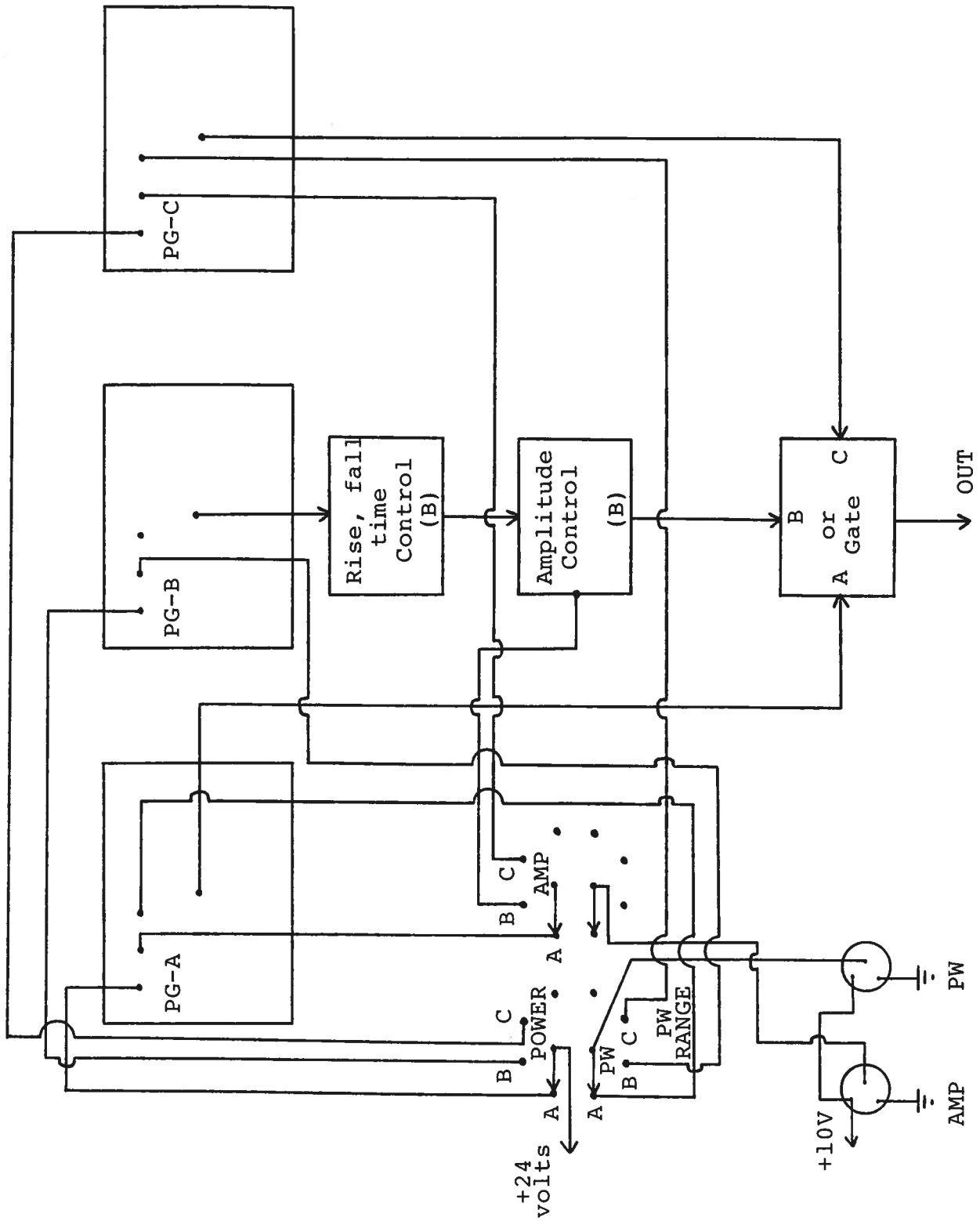
BACK PANEL CONTROLS



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

D)

FUNCTIONAL BLOCK DIAGRAM



SYSTEM DESCRIPTION AND REPAIR PROCEDURE

The AVR unit consists of the following basic modules:

- a) PG-A pulse generator module
- b) PG-B pulse generator module
- c) PG-C pulse generator module
- d) PS-B power supply module (generates +390 volts for PG-B module)
- e) TRF-B rise time, fall time module for B
- f) EA-B amplitude control module for B
- g) PE-PC power combiner module (or gate)
- h) PS-15 module. Supplies -15V DC to various modules
- i) 24 volts DC power supply board
- j) AVR-OL overload module

The key modules are interconnected as shown in Fig. D.

In the event that the unit does not provide an output, check the 0.25 Ampere line fuse and the 1.0 Ampere SB fuse in the rear panel fuse holder. If no output is obtained for Range A, then the PG-A module must be replaced. If no output is obtained for Range B, it is most likely that the SL3 switching elements on the side of the PG-B module have failed. The case of the SL3 elements should be at a DC potential of 350 volts. If this potential is substantially less, then the SL3 elements should be replaced. If no output is obtained for Range C, it is most likely that the SL5 switching elements on the bottom of the PG-C module have failed. The SL5 elements may be accessed by removing the 1.5 x 3.0 inch cover plate on the bottom side of the AVR-E3-W-PS chassis and extracting the SL5 elements from their sockets by means of needle nose pliers. The SL5 element is an N channel VMOS transistor in a TO 220 package and its operation may be checked on a curve tracer. When re-installing the SL5 elements, take care to insure that the short lead is placed adjacent to the black dot on the bottom of the chassis.

