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SINCE 1975

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INSTRUCTIONS

MODEL AVRFB-4-C PULSE GENERATOR

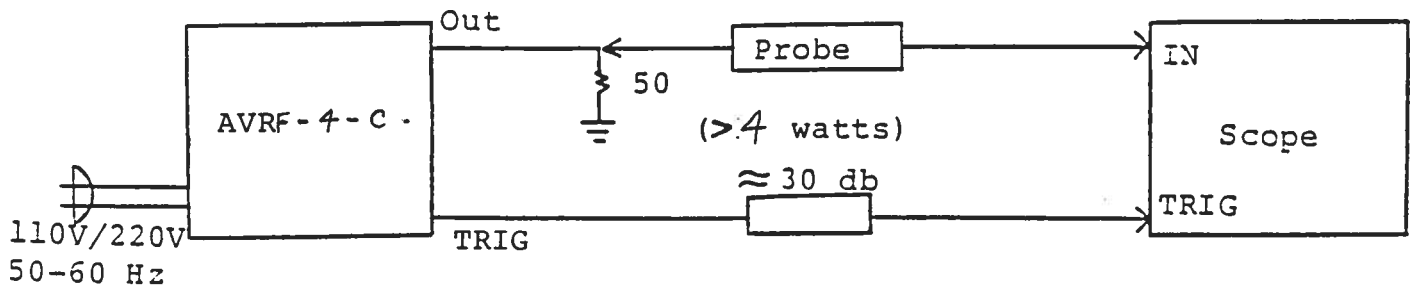
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WARRANTY

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) **CAUTION:** EXTREME CAUTION SHOULD BE FOLLOWED WHEN USING THIS INSTRUMENT AS IT GENERATES OUTPUT PULSE AMPLITUDES AS HIGH AS 400 VOLTS.
- 2) The equipment should be connected in the general fashion shown above. Since the AVRF unit provides an output pulse rise time of less than 5 ns, a fast oscilloscope (at least 200 MHz and preferably ≥ 1 GHz) should be used to display the waveform. **CAUTION:** This unit requires a well defined 50 Ohm load impedance. The output waveform will be distorted if the impedance differs substantially from 50 Ohms.
- 3) The TRIG 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 ADVANCE-DELAY switch is in the ADVANCE position. The TRIG output lags the main output when the switch is in the DELAY 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 us to 1.0 us.

	MIN	MAX
Range 1	0.01 us	0.1 us
Range 2	0.1 us	1.0 us

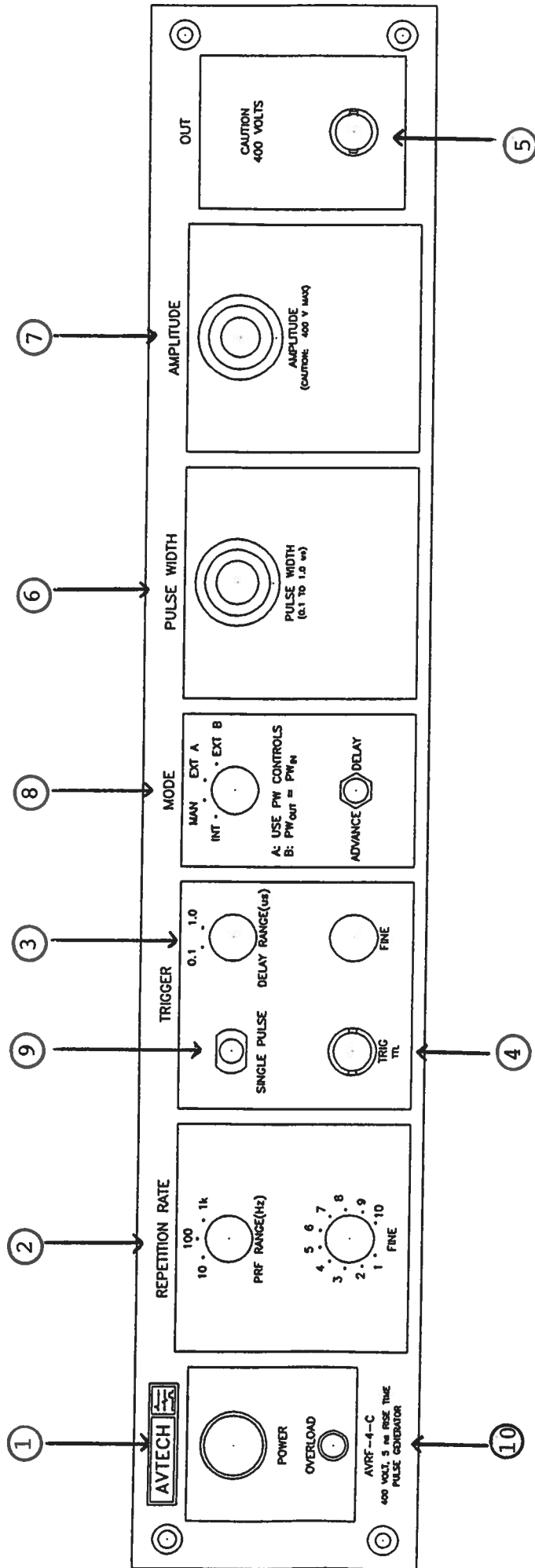
- 4) The output pulse width is controlled by means of the front panel ten turn PW control. Note that the MODE A-B switch must be in the EXT A position.
- 5) To obtain a stable output display the PRF control on the front panel should be set mid range. The front panel INT-EXT toggle switch should be in the INT position and the MODE A-B switch should be in the EXT A 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 amplitude is controlled by means of the front panel ten turn AMP control.

- 7) An external clock may be used to control the output PRF of the AVR unit by setting the front panel INT-EXT toggle switch in the EXT position and applying a 50 ns (or wider) TTL level pulse to the TRIG BNC connector input. With the MODE A-B switch in the A position, the output pulse width will be controlled by the front panel PW controls. If the switch is in the B position, the output pulse width equals the input trigger pulse width.
- 8) For single pulse manual operation, set the front panel INT-EXT-MAN switch in the MAN position and push the SINGLE PULSE button.
- 9) 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 4 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.
- 10) OVERLOAD. An automatic overload protective circuit controls the front panel overload light. If the unit is overloaded (by operating at an exceedingly high duty cycle or by operating into a very low impedance), 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)
 - 4) Reducing the output amplitude (i.e. switch to a lower range).

The overload light may illuminate when the prime power is first applied. The light will extinguish after a few seconds and the unit will then operate normally.

Note that the output stage will safely withstand a short circuited load condition.

- 11) CAUTION: DC potentials as high as 450 Volts exist in the interior of the instrument. For this reason it is recommended that the top cover of the unit should not be removed and that the unit should be returned to the factory for servicing (when necessary).
- 12) 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.
- 13) For further assistance:
Tel: 613-226-5772
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FRONT PANEL CONTROLS

Fig. 2

- (1) ON-OFF Switch. Applies basic prime power to all stages.
- (2) PRF Control. Varies PRF from 1.0 Hz to 1.0 kHz as follows:

Range 1	1 Hz	10 Hz
Range 2	10 Hz	100 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) and the main output (5). This delay is variable over the range of 0.1 to about 100 us. Delay LEADS or LAGS depending on the position of the ADVANCE-DELAY switch.

	MIN	MAX
Range 1	0.01 us	0.1 us
Range 2	0.1 us	1.0 us

- (4) TRIG 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. This output precedes the output at (5) if the two position ADVANCE-DELAY switch is in the ADVANCE position. This output follows the output at (5) if the switch is in the DELAY position. The delay range is variable from 0.01 us to 1.0 us. 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 50 Ohm load.
- (6) PW Control. A ten turn control which varies the output pulse width (when the MODE A-B switch is in the A position).
- (7) AMP Control. A ten turn control which varies the output pulse amplitude from 0 to 400 V.
- (8) EXT-INT-MAN Control, MODE AB. With this toggle switch in the INT position, the PRF of the AVRF 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 AVRF unit requires a 50 ns (or wider) 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. With the MODE A-B switch in the A position the output pulse width is controlled by the PW controls.

With the MODE A-B switch in the B position, the output pulse width equals the input trigger pulse width. For single pulse operation, set the INT-EXT-MAN switch in the MAN position.

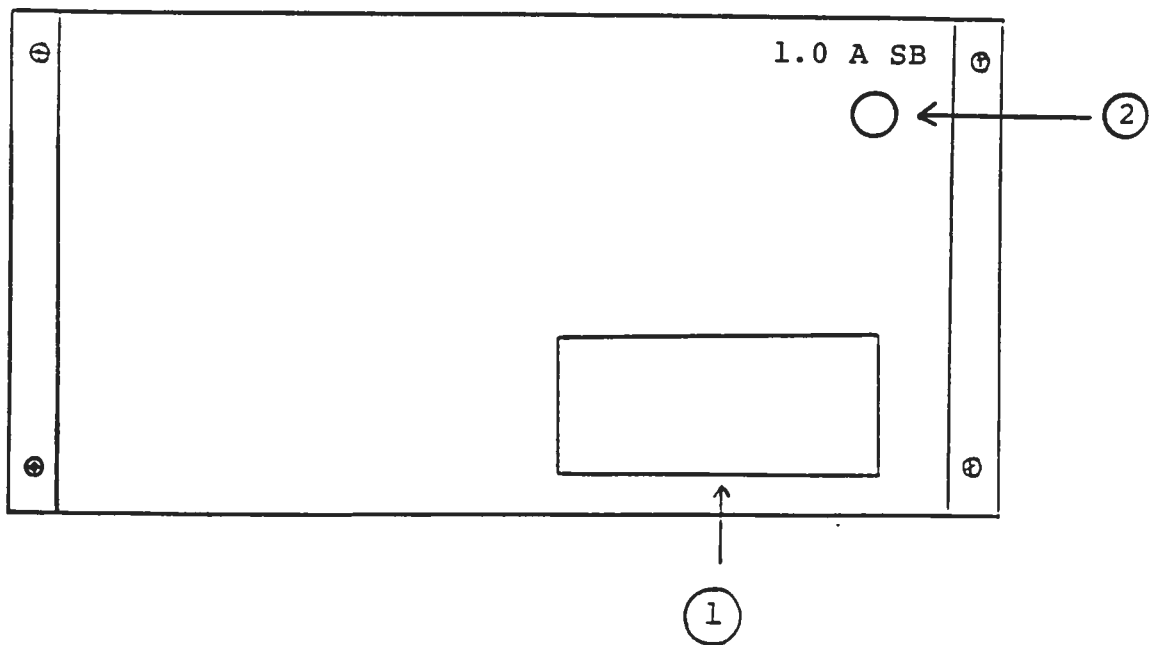
- (9) SINGLE PULSE. For single pulse manual operation, set the front panel INT-EXT-MAN switch in the MAN position and push the SINGLE PULSE button.
- (10) OVERLOAD. An automatic overload protective circuit controls the front panel overload light. If the unit is overloaded (by operating at an exceedingly high duty cycle or by operating into a very low impedance), 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)
 - 4) Reducing the output amplitude (i.e. switch to a lower range)

The overload light may illuminate when the prime power is first applied. The light will extinguish after a few seconds and the unit will then operate normally.

Note that the output stage will safely withstand a short circuited load condition.

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.

TOP COVER REMOVAL AND RACK MOUNTING

- 1) The interior of the instrument may be accessed by removing the four Phillips screws on the top panel. With the four screws removed, the top cover may be slid back (and off).
- 2) The -R5 rack mount kit may be installed after first removing the one Phillips screw on the side panel adjacent to the front handle.

Fig. 4a

POWER SUPPLY

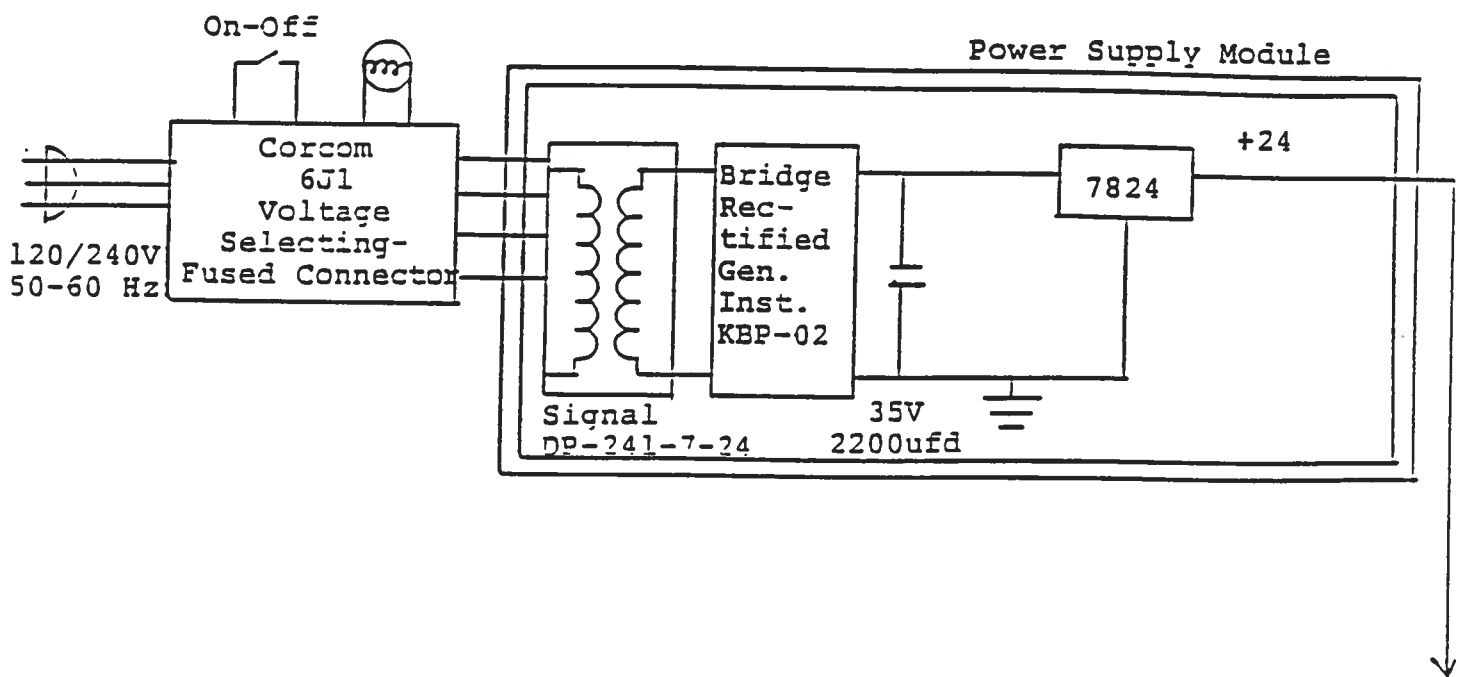


Fig. 4b

1) The AVRF unit consists of five basic components or modules:

- a) Metal chassis
- b) AC to DC power supply board
- c) -PG pulse generator module
- d) -PS power supply module
- e) Overload control module

The modules are interconnected as shown above.

- 2) If the unit malfunctions, disconnect from the 60 Hz supply and the trigger source and remove the four Phillips screws on the top panel of the unit. With the screws removed, the top cover may be slid off.
- 3) Reconnect to the 60 Hz source and check the voltage on the line connecting the AVR-PS output to the +24 V pin of the AVR-PG module. A voltage of +24 Volts should be recorded. If the voltage is substantially less than +24 Volts, disconnect the 60 Hz source and disconnect the line from the +24 Volt pin. Connect a 50 Ohm 8 Watt resistance to the output of the AVR-PS module. Reconnect to the 60 Hz source and measure the voltage across this resistor. A voltage of +24 Volts should be indicated. If the voltage is substantially less than 24 Volts the AVR-PS module is defective and should be either repaired or replaced. If the measured voltage is equal to +24 Volts then the SL19TF switching elements in the AVR-PG module have probably failed. The SL19TF switching elements are easily replaced by removing the cover plate on the instrument bottom side and extracting the SL19TF switching elements from their sockets using a pair of needle nose pliers. Before attempting this first insure that the prime power is off and also briefly ground the metal tabs on the SL19TF elements to the chassis as the bypass capacitors may be charged to 425 Volts. Replacement SL19TF units must be ordered directly from Avtech. When reinstalling the SL19TF units in their sockets, insure that the shortest of the three terminals is adjacent to the black dot on the AVR-PG chassis.

August 2191

Disk: AVRF

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