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SINCE 1975

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INSTRUCTIONS

MODEL AVR-3-PW-C-P-UMB PULSE GENERATOR

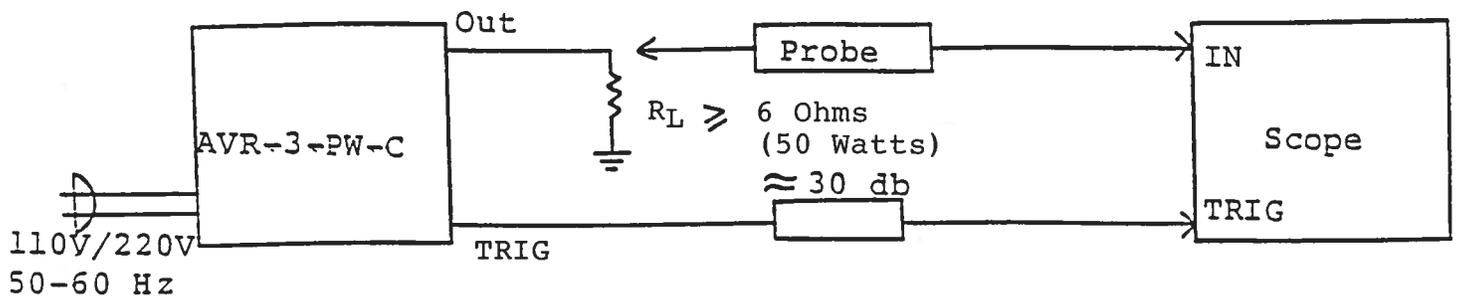
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WARRANTY

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 100 MHz. Note that the unit is capable of providing an average output power of 50 Watts and so the load must be capable of dissipating this power.
- 2) 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.
- 3) The output pulse width is controlled by means of the front panel one turn PW control (ten turn with -PWT option) 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 (i.e. 50%).

	PW min	PW max
Range 1	0.3 us PRF max 500 Hz	5 us PRF max 500 Hz
Range 2	5 us PRF max 500 Hz	50 us PRF max 500 Hz
Range 3	50 us PRF max 500 Hz	500 us PRF max 500 Hz
Range 4	0.5 ms PRF max 500 Hz	5 ms PRF max 100 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 ($R_{IN} \geq 10K$). (option).

- 4) To obtain a stable output display the PRF control on the front panel should be set mid range. The front panel TRIG 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 (10 turn for -AT option). 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 ($R_{IN} \geq 10K$). (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 us (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. When triggered externally, the output pulse width is controlled by the front panel PW controls provided the MODE A-B switch is in the A position. The MODE A-B switch is accessed by removing the top cover (by removing the four Phillips screws on the top panel and sliding the top cover back and off). When the MODE A-B switch is in the B position, the output pulse width equals the input trigger pulse width. The unit is shipped with the switch in the A position.
- 7) For single pulse manual operation, set the front panel INT-EXT-MAN switch in the MAN position and push the SINGLE PULSE button.
- 8) 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 0.5 us to 5 ms. The TRIG output precedes the main output when the ADVANCE-DELAY switch is in the ADVANCE position and lags when the switch is in the DELAY position.

	MIN	MAX
Range 1	0.5 us	5 us
Range 2	5 us	50 us
Range 3	50 us	0.5 ms
Range 4	0.5 ms	5 ms

9) AVR-3-PW-C 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)

10) 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.

11) For additional assistance:

Tel: (613) 226-5772
Fax: (613) 226-2802

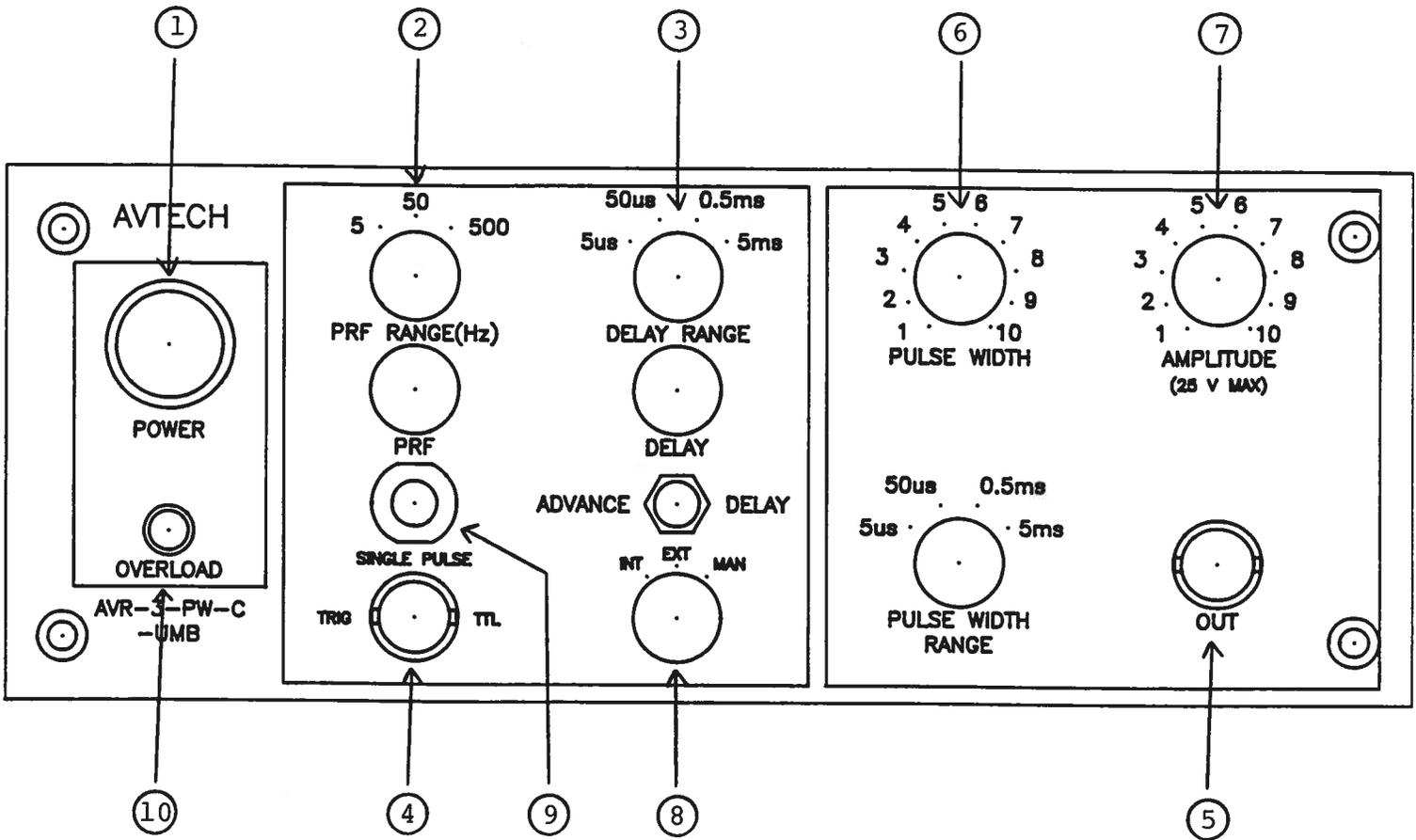


Fig. 2

FRONT PANEL CONTROLS

- (1) ON-OFF Switch. Applies basic prime power to all stages.
- (2) PRF Control. Varies PRF from 0.5 Hz to 500 Hz as follows:

0.5 Hz to	5 Hz
5 Hz to	50 Hz
50 Hz to	500 Hz

- (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 0.5 us to about 5 ms. Delay LEADS or LAGS depending on the position of the ADVANCE-DELAY switch.

	MIN	MAX
Range 1	0.5 us	5 us
Range 2	5.0 us	50 us
Range 3	50 us	500 us
Range 4	0.5 ms	5 ms

- (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 0.5 us to 5 ms. 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 low impedance load.

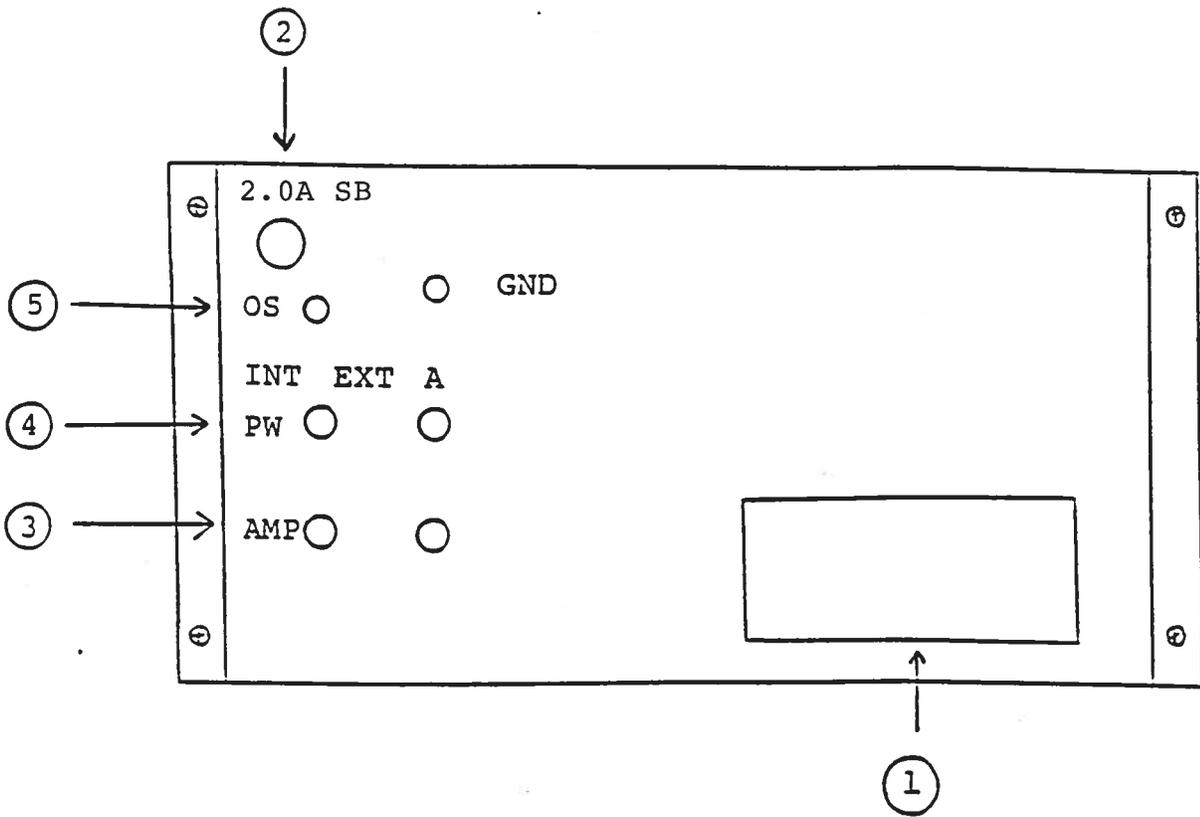
- (6) PW Control. A one turn control (ten turn for -PWT option) and 4 position range switch which varies the output pulse width from 0.5 us to 5 ms. Note that the unit may fail if operated at duty cycles exceeding 50%.

	PW min	PW max
Range 1	0.3 us	5.0 us
Range 2	5.0 us	50 us
Range 3	50 us	500 us
Range 4	0.5 ms	5.0 ms

- (7) AMP Control. A one turn control (ten turn for -AT option) which varies the output pulse amplitude from 0 to +25 Volts.
- (8) INT-EXT-MAN 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 us 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. When triggered externally, the output pulse width is controlled by the front panel PW controls provided the MODE A-B switch is in the A position. The MODE A-B switch is accessed by removing the top cover (by removing the four Phillips screws on the top panel and sliding the top cover back and off). When the MODE A-B switch is in the B position, the output pulse width equals the input trigger pulse width. The unit is shipped with the switch in the A 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 INDICATOR. AVR-3-PW-C 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 (1.0 A SB).
- (2) 2.0A SB. Fuse which protects the output stage if the output duty cycle rating is exceeded.

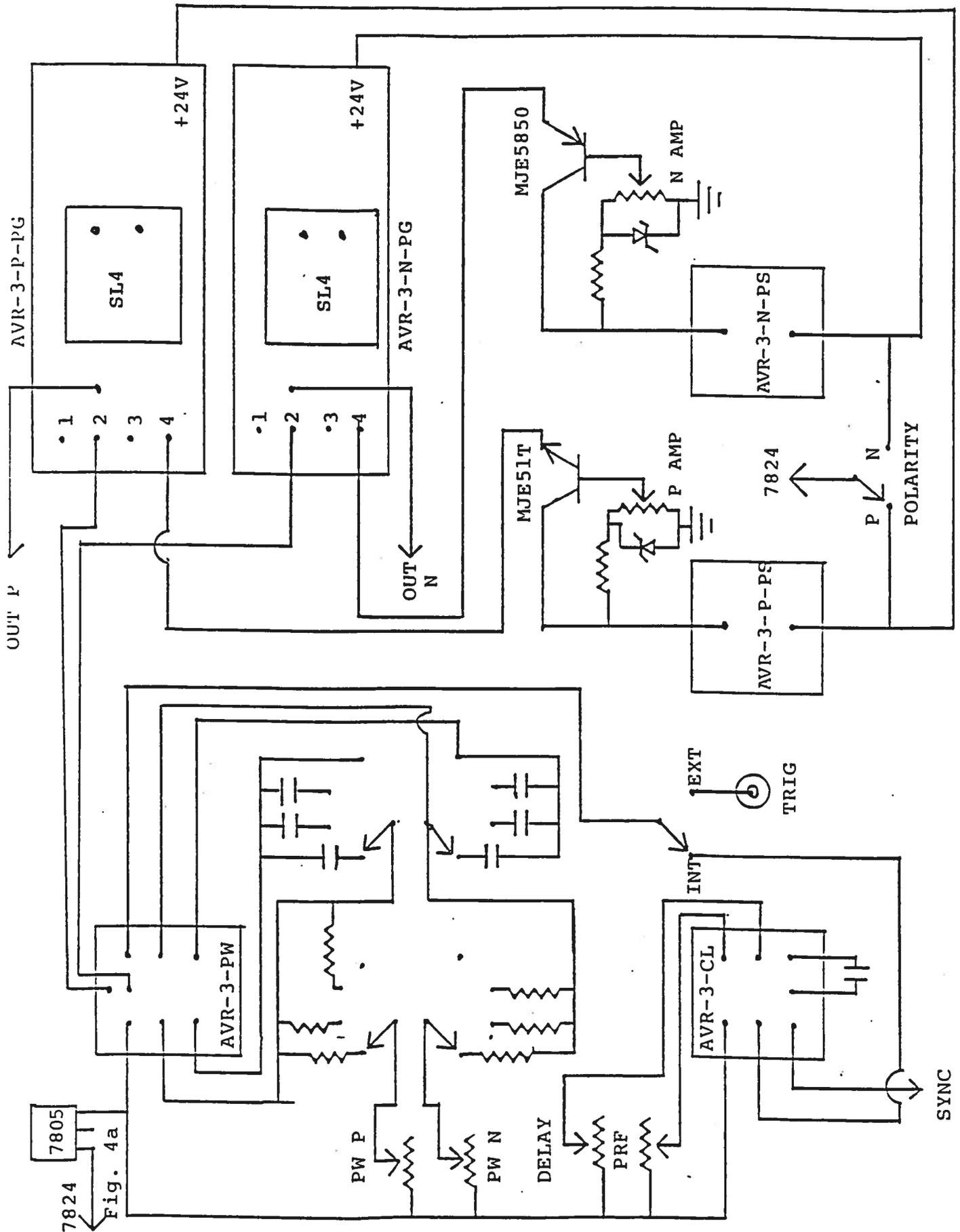


Fig. 4b SYSTEM BLOCK DIAGRAM (FOR NON EA, EW OPTION UNITS)

Fig. 4a

POWER SUPPLY

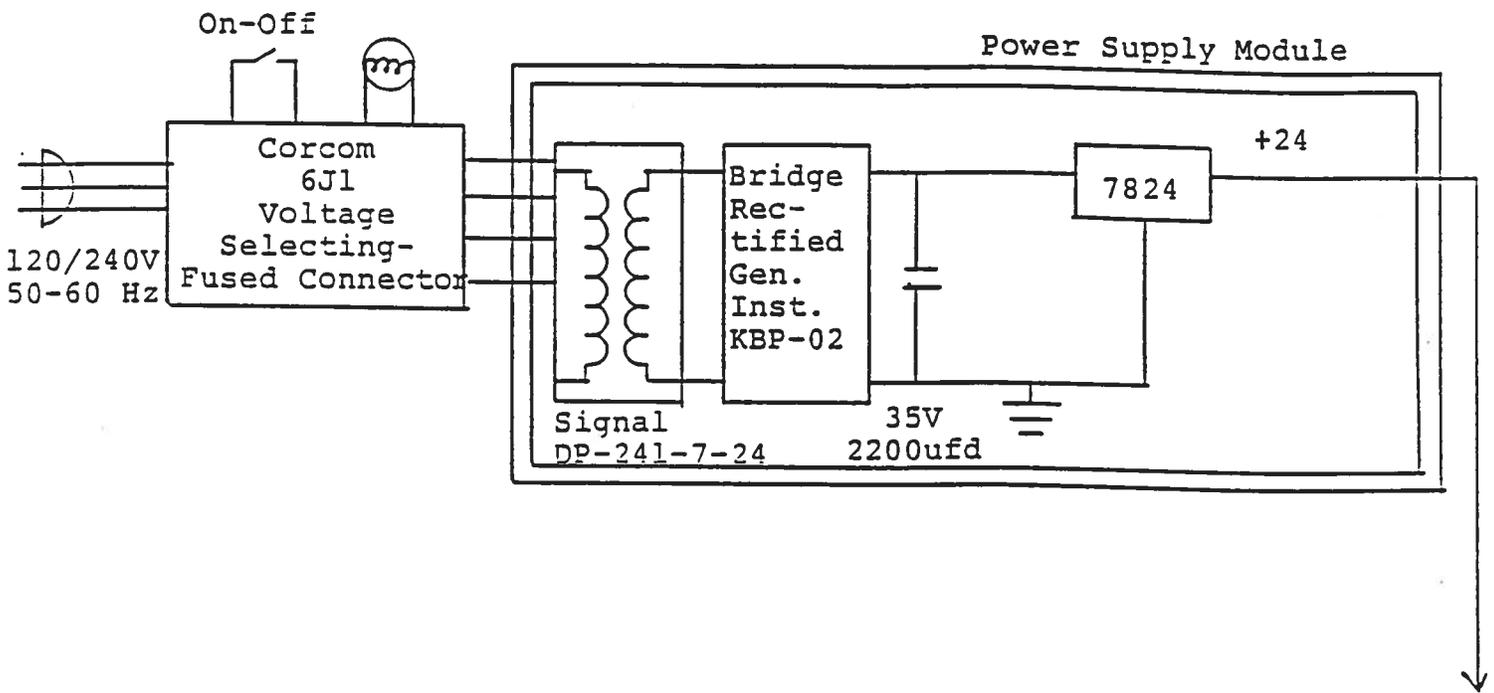


Fig. 4b

SYSTEM DESCRIPTION AND REPAIR PROCEDURE

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

- 1) -UMB-PG pulse generator module
- 2) -CL2 clock module
- 3) +36V, +24V, +5.8V power supply board
- 4) -OL overload module
- 5) -PW2 pulse width module
- 6) -DB single pulse module

The modules are interconnected as shown in Fig. 4.

In the event of an instrument malfunction, it is most likely that the 2.0 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 (SL10T) 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 SL10T tabs to discharge the 30 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 SL10T 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 SL10T 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.). The SL10T elements are electrically isolated from the small aluminum heat sinks but are bonded to the heat sinks using WAKEFIELD TYPE 155 HEAT SINK ADHESIVE. 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:

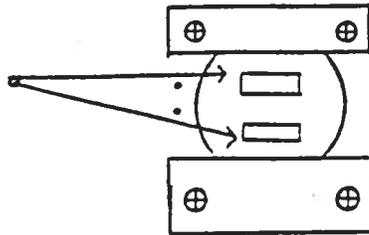
- a) 0.1 us TTL level outputs are observed at pins 2 and 3.
- b) The PRF of the outputs can be varied over the range of 10 Hz to 1 kHz using the PRF controls.
- c) The relative delay between the pin 2 and 3 outputs can be varied by at least 1 ns by the DELAY control.

The sealed clock module must be returned to Avtech for repair or replacement if the above conditions are not observed.

SL19T HEAT SINKING

BACK

155
HEAT SINK
ADHESIVE*



SHORT LEAD →

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Fax Ref No: 10267 From: Avtech Electrosystems Ltd.

To: University of Michigan Our Fax No: (613) 226-2802

Date: October 21, 1994

Attn: Choul Gyen Lee Receivers Fax No: 313-764-7453
Tel: 313-763-5359

Subject: Quotation No. of pages: 4

Following my quote of August 8th and our telephone conversation of October 20th, I am pleased to provide a revised price and delivery quotation for a special purpose pulsed voltage source meeting the following specifications:

Model designation: AVR-3-PW-C-P-UMB.

Output amplitude: 0 to +25 Volts to $R_L \geq 6$ Ohms. One turn control.

Output pulse width: 5 ms to 300 ns. Four-position range switch and one turn fine control.

Max duty cycle: 50% (self-contained duty cycle limit circuit prevents duty cycle from exceeding 50%).

Rise, fall time: ≤ 50 ns.

PRF: 1 Hz to 500 Hz.

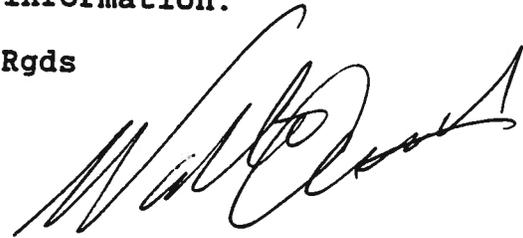
Other: See standard AVR-3-PW-C, pages 36 and 37 of Cat. No. 9.

Price: \$3,698.00 US each, FOB destination. Please note that this price includes our standard 5% academic discount.

Delivery: 45-60 days.

Thank you for your continuing interest in our products. Please call me again (1-800-265-6681) if you require any additional information.

Rgds

A handwritten signature in black ink, appearing to read 'Walter Chudobiak', written in a cursive style.

Dr. Walter Chudobiak
Chief Engineer

WC:pr

Feb. 20/95

-EW

Disk: AVR-3-C1 (current)

-EA

Name: 3PWCPUMB.INS