



# AVTECH ELECTROSYSTEMS LTD.

NANOSECOND WAVEFORM ELECTRONICS  
SINCE 1975

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

TEL: 1-800-265-6681  
FAX: 1-800-561-1970

e-mail: [info@avtechpulse.com](mailto:info@avtechpulse.com)  
<http://www.avtechpulse.com>

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

## INSTRUCTIONS

MODEL AVM-1-C-OT-P-PN 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 assumed by Avtech with respect to this product and no other warranty or guarantee is either expressed or implied.

### TECHNICAL SUPPORT

Phone: 613-226-5772 or 1-800-265-6681

Fax: 613-226-2802 or 1-800-561-1970

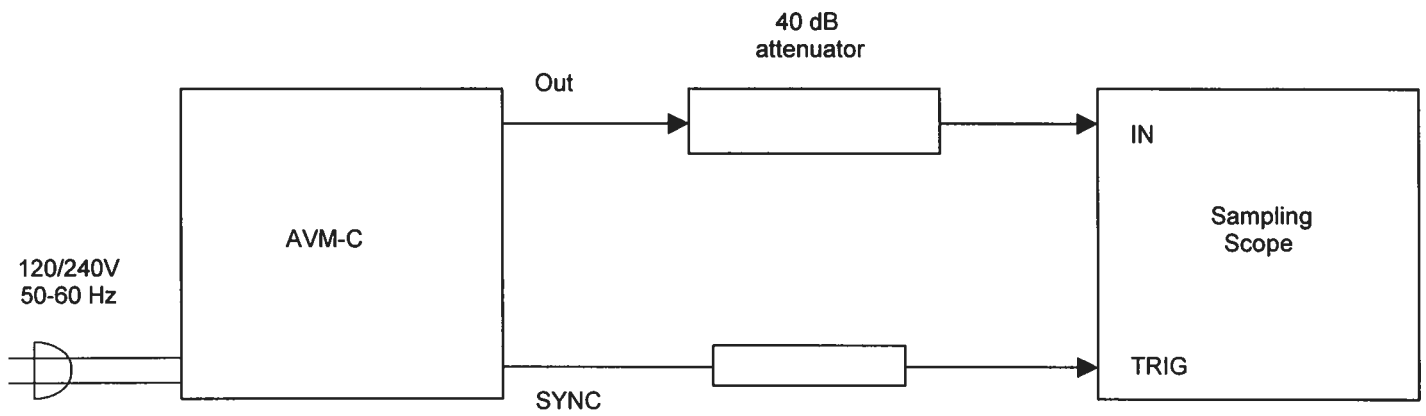
E-mail: [info@avtechpulse.com](mailto:info@avtechpulse.com)

World Wide Web: <http://www.avtechpulse.com>

## TABLE OF CONTENTS

WARRANTY .....	2
FIG. 1: PULSE GENERATOR TEST ARRANGEMENT.....	4
GENERAL OPERATING INSTRUCTIONS .....	5
FIG. 2: FRONT PANEL CONTROLS FRONT PANEL CONTROLS .....	7
FRONT PANEL CONTROLS .....	8
FIG. 3: BACK PANEL CONTROLS (For Units without OT or EO) .....	9
BACK PANEL CONTROLS (For Units Without OT or EO Option).....	9
FIG. 3: BACK PANEL CONTROLS (For Units with The EO or OT Options).....	11
BACK PANEL CONTROLS (For Units with OT or EO Option).....	12
POWER SUPPLY AND FUSE REPLACEMENT .....	13
PERFORMANCE CHECK SHEET .....	15

FIG. 1: PULSE GENERATOR TEST ARRANGEMENT



## GENERAL OPERATING INSTRUCTIONS

- 1) The bandwidth capability of components and instruments used to display the pulse generator output signal (attenuators, cables, connectors, etc.) should exceed ten gigahertz.
- 2) The use of 40-db attenuator at the sampling scope vertical input channel will insure a peak input signal to the sampling scope of less than one volt.
- 3) The sync output channel provides a 0.2 volt 10 ns pulse.
- 4) To obtain a stable output display the PRF controls on the front panel should be set mid-range while the PRF range switch may be in either range. The front panel TRIG toggle switch should be in the INT position. The front panel DELAY control and the scope triggering controls are then adjusted to obtain a stable output. It is recommended that the DELAY control first be set max counter clockwise and then turned clockwise until a stable display is obtained. The scope may then be used to set the desired PRF by rotating the PRF controls and by means of the PRF range switch. The stability of the display on some sampling scopes is very sensitive to the trigger delay setting, particularly at high PRF (e.g. 10 to 25 MHz). If necessary, consult your sample scope instructions manual for the proper triggering method.
- 5) The output pulse width is controlled by means of the front panel one-turn PW control. The control should initially be set maximum clockwise and the pulse width adjusted using an oscilloscope. Rotation of the PW pot causes the position of the falling edge of the pulse to change.
- 6) To voltage control the output pulse width, set the rear panel switch in the EXT position and apply 0 to +10V to connector A (RIN > 10K). (EW option).
- 7) The output pulse amplitude is controlled by means of the front panel one-turn AMP control. The pulse width may change by several nanoseconds as the output amplitude is reduced from maximum to minimum. Therefore it is convenient to first set the desired amplitude and then set the desired pulse width.
- 8) To voltage control the output amplitude, set the rear panel switch in the EXT position and apply 0 to +10V to connector B (RIN > 10K). (EA option).
- 9) To DC offset the output pulse connect a DC power supply set to required DC offset value to the back panel terminals marked O.S. The maximum attainable DC offset voltage is +50-volts (for units without the OT or EO option only).
- 10) For units with the OT or EO options, the output DC offset is variable from +5 to -5 volts by means of the front panel one turn OFFSET control. The offset control may be turned off by means of the rear panel ON-OFF OFFSET switch.

- 11) For units with the EO option, the output offset may be voltage controlled by setting the rear panel switch in the EXT position and applying 0 to +10 volts to connector A (RIN > 10K).
- 12) The AVM output pulse position or propagation delay can be varied for up to 5 ns by means of the DELAY Tp control. Rotating the Tp control clockwise increases the delay. (-D option).
- 13) An external clock may be used to control the output PRF of the AVM unit by setting the front panel TRIG toggle switch in the EXT position and applying a 15 ns (or wider) TTL level pulse to the TRIG BNC connector input. The AVM unit triggers on the rising edge of the input trigger pulse. For operation in this mode, the scope time base must also be triggered by the external clock rather than from the SYNC output.
- 14) **WARNING:** Model AVM-C may fail if triggered at a PRF greater than 25.0 MHz.
- 15) The Model AVM-C pulse generator can withstand an infinite VSWR on the output port.
- 16) Dual Polarity Option (for units without the OT or EO options).

To invert the output of the AVM unit, connect the AVX-2-T unit to the OUT port. An inverted pulse is then obtained at the OUT port of the AVX-2-T unit. To offset the inverted pulse, apply the required DC level to the DC terminal of the AVX-2-T unit.

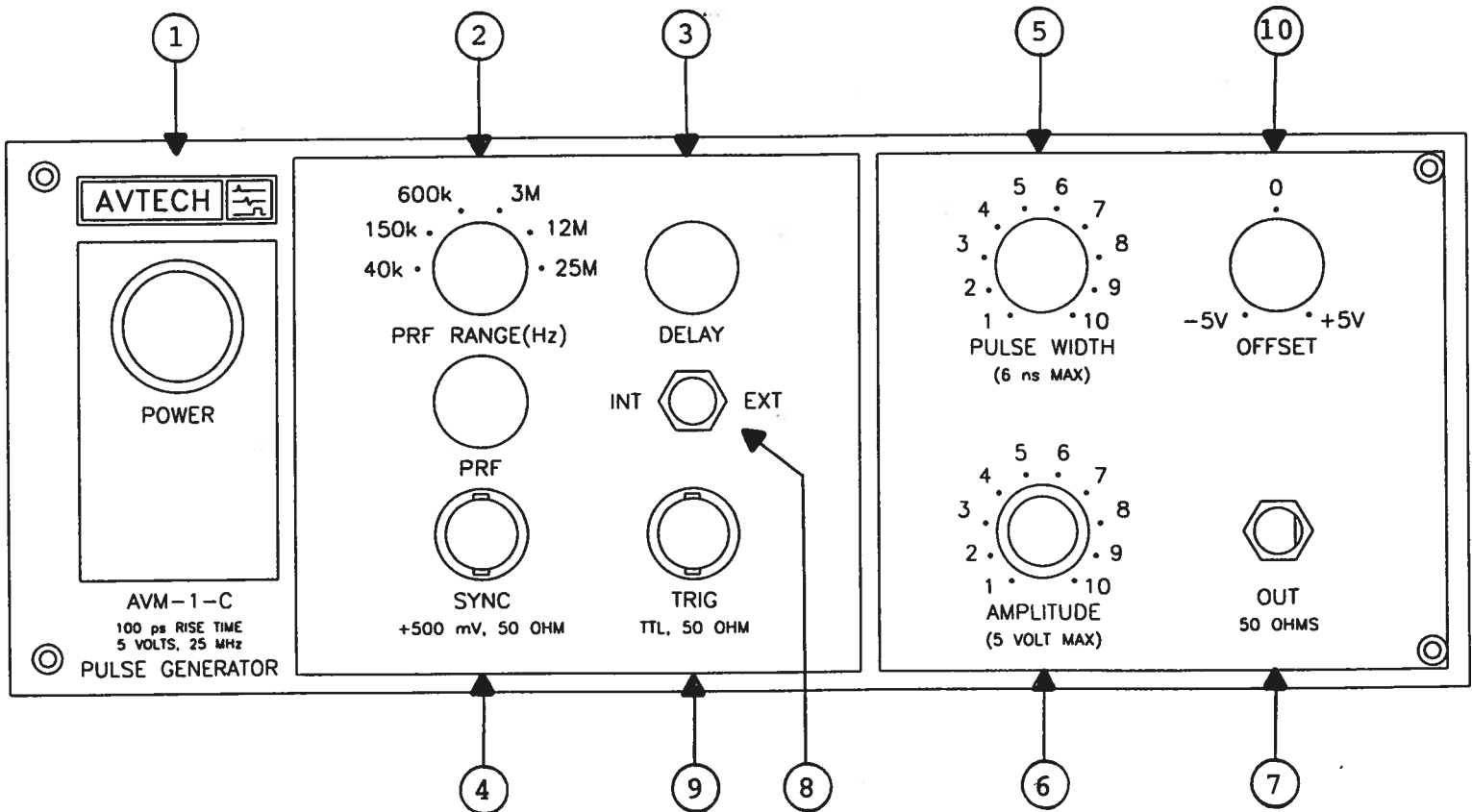
- 17) Dual Polarity Option (for units with the OT or EO options).

To invert the output of the AVM unit, connect the AVX-2-T unit to the OUT port. An inverted pulse with a rise time <100 ps is then obtained at the OUT port of the AVX-2-T unit. To offset the inverted pulse, connect a lead from the rear panel OS OUT banana plug to the DC terminal of the AVX-2-T unit. The DC offset at the output of the AVX-2-T unit is then controlled by the front panel OFFSET control.

- 18) The AVM-C unit can be converted from 120 to 240V 50-60 Hz operation by adjusting the voltage selector card in the rear panel fused voltage selector-cable connector assembly.
- 19) For additional assistance:

Tel: 613-226-5772  
Fax: 613-226-2802  
Email: [info@avtechpulse.com](mailto:info@avtechpulse.com)

**FIG. 2: FRONT PANEL CONTROLS**



## FRONT PANEL CONTROLS

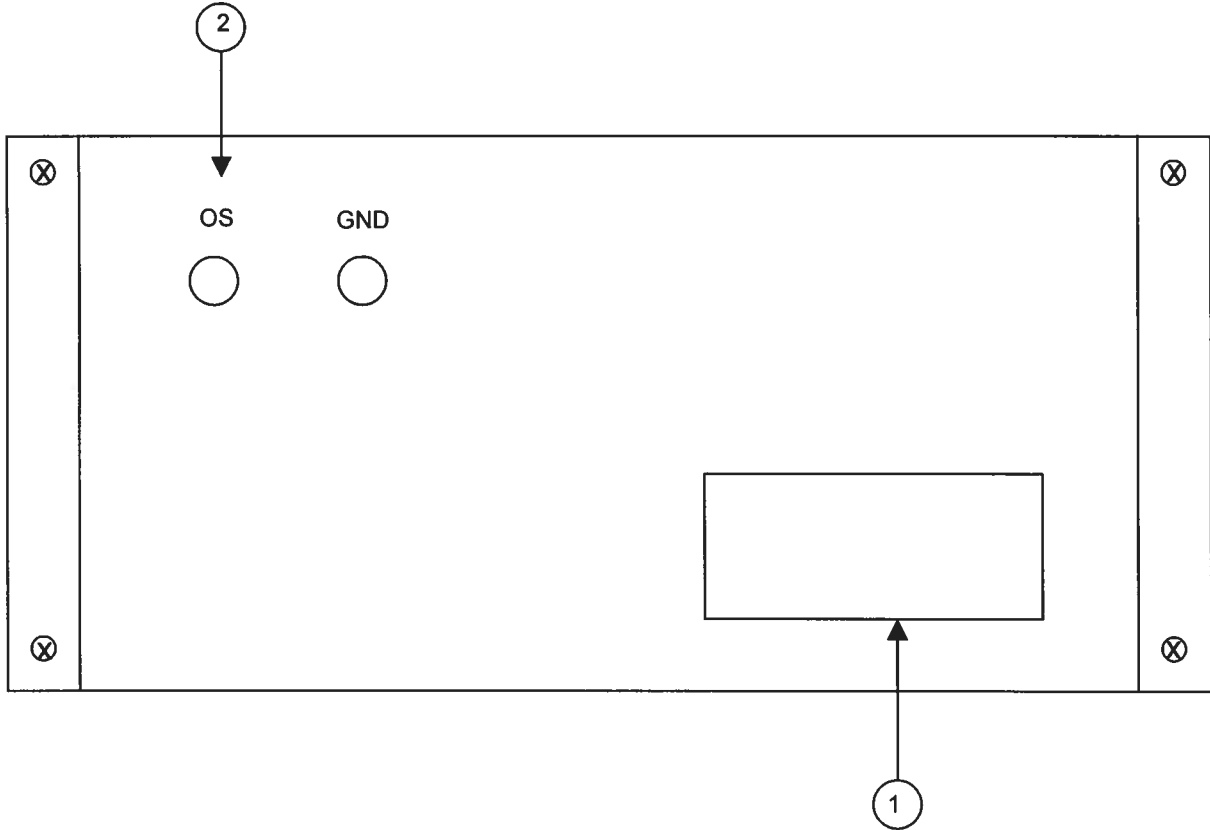
- (1) ON-OFF Switch. Applies basic prime power to all stages.
- (2) PRF Control. PRF RANGE and PRF controls determine output PRF as follows:

	PRF MIN	PRF MAX
Range 1	10 kHz	50 kHz
Range 2	50 kHz	250 kHz
Range 3	185 kHz	650 kHz
Range 4	650 kHz	3.3 MHz
Range 5	3.3 MHz	13.3 MHz
Range 6	5.0 MHz	25 MHz

- (3) DELAY Control. Controls the relative delay between the reference output pulse provided at the SYNC output (4) and the main output (7). This delay is variable over the range of 0 to at least 100 ns.
- (4) SYNC Output. This output precedes the main output (7) and is used to trigger the sampling scope time base. The output is a 200 mV 10 ns (approx) pulse capable of driving a fifty-ohm load.
- (5) PW Control. A one-turn control, which varies the output pulse width.
- (6) AMP Control. A one-turn control, which varies the output pulse amplitude from 0 to max output to a fifty ohm load.
- (7) OUT Connector. SMA connector provides output to a fifty-ohm load.
- (8) EXT-INT Control. With this toggle switch in the INT position, the PRF of the AVM unit is controlled via an internal clock, which in turn is controlled by the PRF controls. With the toggle switch in the EXT position, the AVM unit requires a 15 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.
- (9) TRIG Input. The external trigger signal is applied at this input when the EXT-INT toggle switch is in the EXT position.
- (10) DC OFFSET. For units with the OT or EO options, the output DC offset is variable from +5 to -5 Volts by means of the front panel turn OFFSET control. The offset control may be turned off by means of the rear panel ON-OFF OFFSET switch.



**FIG. 3: BACK PANEL CONTROLS (For Units without OT or EO)**



### BACK PANEL CONTROLS (For Units Without OT or EO Option)

- (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.

For AC line voltages of 110-120V, the power selector card should be installed so that the "120" marking is visible from the rear of the instrument.

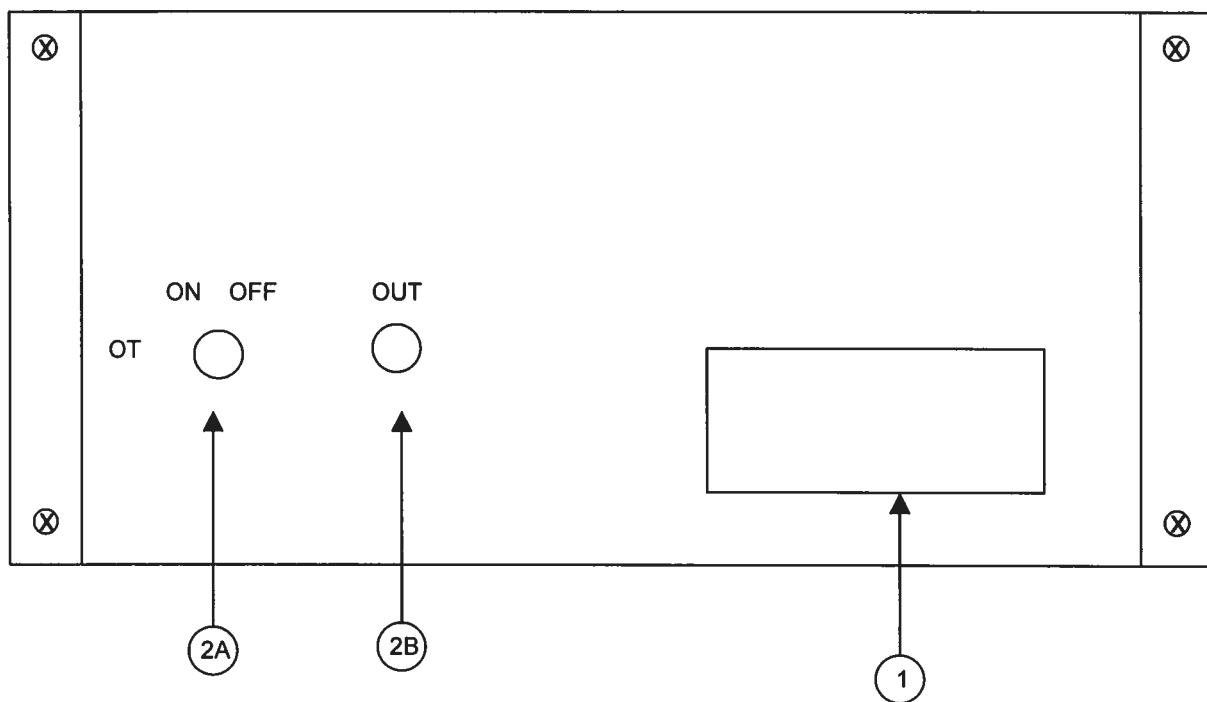
For AC line voltages of 220-240V, the power selector card should be installed so that the "240" marking is visible from the rear of the instrument.

If it is not set for the proper voltage, remove the fuse and then grasp the card with a pair of pliers and remove it. Rotate horizontally through 180 degrees. Reinstall the card and the correct fuse.

In the 120V setting, a 0.5A slow blow fuse is required. In the 240V setting, a 0.25A slow blow fuse is required.

- (2) DC OFFSET Input. TO DC offset the output pulse, connect a DC power supply set to the desired offset value to these terminals. The maximum allowable DC offset voltage is  $\pm 50$  Volts. ( $\pm 250$  mA max).

FIG. 3: BACK PANEL CONTROLS (For Units with The EO or OT Options)



BACK PANEL CONTROLS (For Units with OT or EO Option)

- (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.

For AC line voltages of 110-120V, the power selector card should be installed so that the "120" marking is visible from the rear of the instrument.

For AC line voltages of 220-240V, the power selector card should be installed so that the "240" marking is visible from the rear of the instrument.

If it is not set for the proper voltage, remove the fuse and then grasp the card with a pair of pliers and remove it. Rotate horizontally through 180 degrees. Reinstall the card and the correct fuse.

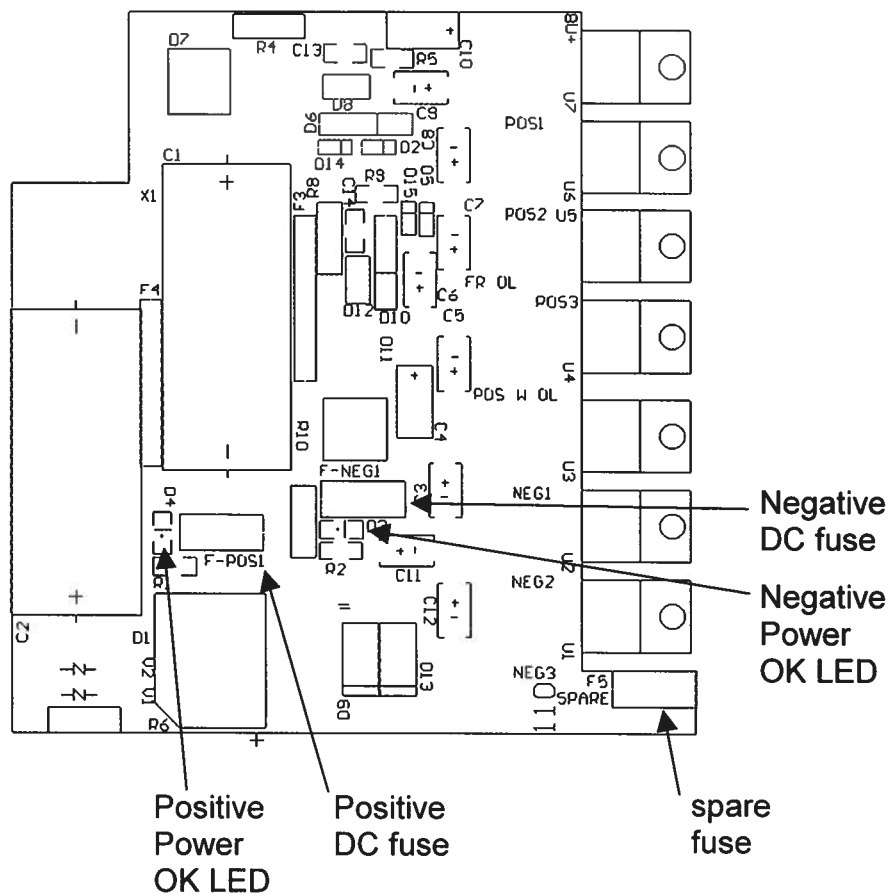
In the 120V setting, a 0.5A slow blow fuse is required. In the 240V setting, a 0.25A slow blow fuse is required.

- (2A) Two-position switch which turns output DC offset ON or OFF. (EO or OT options).
- (2B) DC output offset potential appears at this terminal. To offset the inverted pulse on AVM units with dual polarity option (-PN), connect this terminal to the DC terminal of the AVX-2-T module.

## POWER SUPPLY AND FUSE REPLACEMENT

This instrument has three fuses (plus one spare). One, which protects the AC input, is located in the rear-panel power entry module, as described in the “Rear Panel Controls” section of this manual. If the power appears to have failed, check the AC fuse first.

The other two fuses (plus one spare) are located on the internal DC power supply, as shown below:



The spare fuse may be used to replace one of the other fuses, if required.

The three fuses on this circuit board are 0.5A slow-blow fuses, Littlefuse part number R452.500. (This fuse can be ordered from Digikey, [www.digikey.com](http://www.digikey.com). The Digikey part number is F1341CT-ND).

If you suspect that the DC fuses are blown, follow this procedure:

1. Remove the top cover, by removing the four Phillips screws on the top cover and then sliding the cover back and off.
2. Locate the two "Power OK" LEDs on the power supply circuit board, as illustrated above.
3. Turn on the instrument.
4. Observe the "Power OK" LEDs. If the fuses are not blown, the two LEDs will be lit (bright red). If one of the LEDs is not lit, the fuse next to it has blown.
5. Turn off the instrument.
6. If a fuse is blown, use needle-nose pliers to remove the blown fuse from its surface-mount holder.
7. Replace the fuse.

May 8/2001  
(edition 1)