



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
<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 AVO-5A1-C-T3-FOICA-EA 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

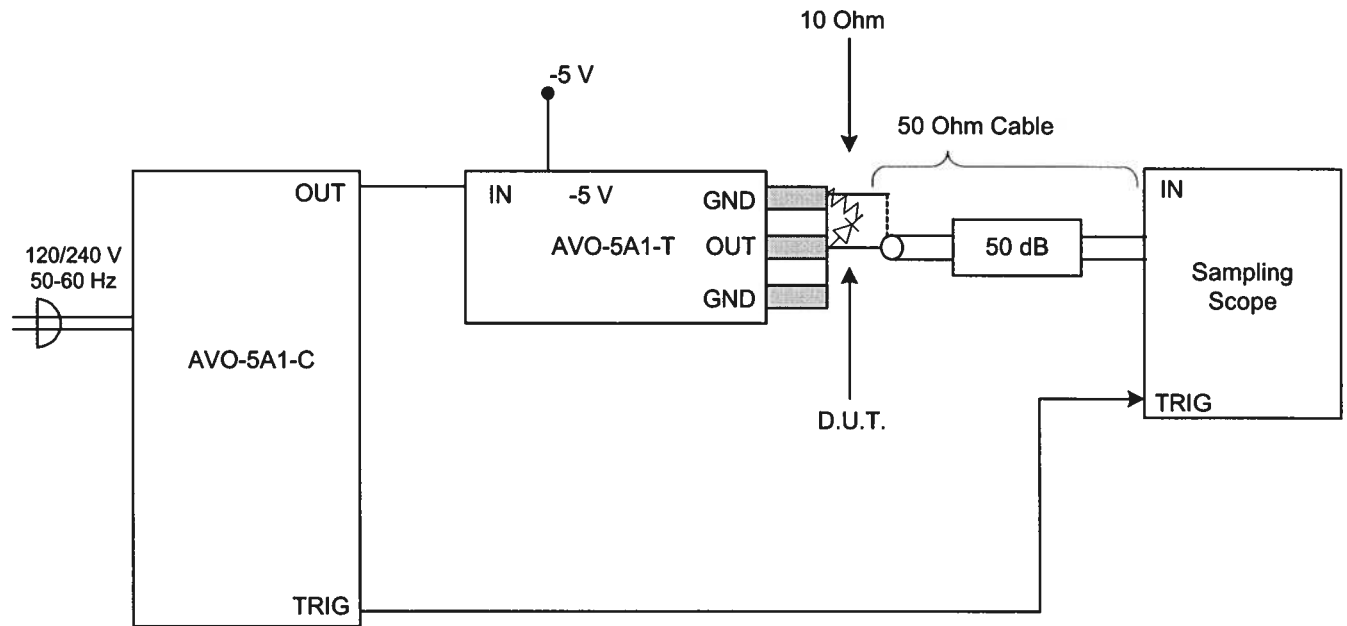
Fax: 613-226-2802 or 1-800-561-1970

E-mail: info@avtechpulse.com

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

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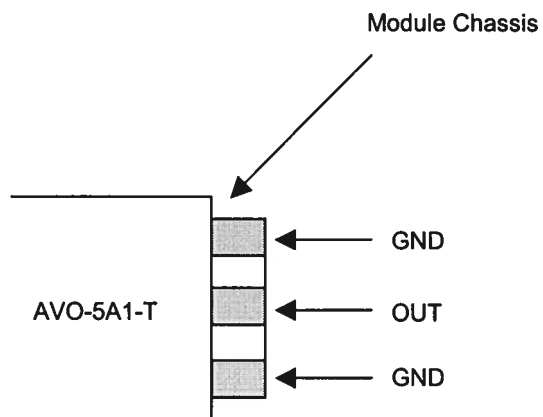
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FIG. 1: PULSE GENERATOR TEST ARRANGEMENT

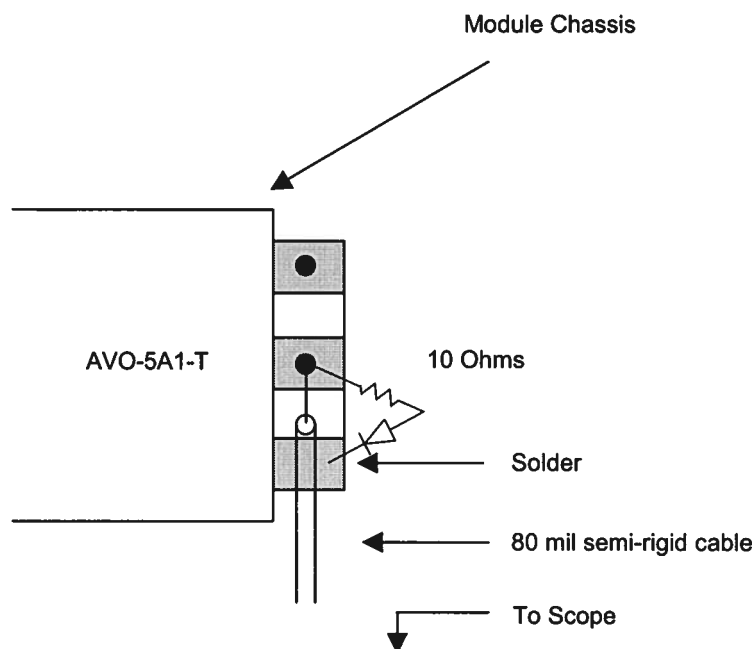
GENERAL OPERATING INSTRUCTIONS

- 1) The bandwidth capability of components and instruments used to display the pulse generator output signal (attenuators, cables, connectors, etc.) should exceed one gigahertz.
- 2) The use of 50 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 TRIG output channel provides TTL level signals.
- 4) To obtain a stable output display the PRF controls on the front panel should be set mid-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. The scope may then be used to set the desired PRF by rotating the PRF. The main output is delayed with respect to the TRIG output by about 250 to 450 ns depending on the DELAY control setting.
- 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.
- 6) 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.
- 7) To voltage control the output amplitude, set the rear panel switch in the EXT position and apply 0 to +10 V to BNC connector A ($R_{IN} > 10K$). (EA Option).
- 8) An external clock may be used to control the output PRF of the AVO unit by setting the front panel PRF range switch in the EXT position and applying a 50 ns (or wider) TTL level pulse to the TRIG BNC connector input.
WARNING: Model AVO-5 may fail if triggered at a PRF greater than 5 kHz.

- 9) The AVO-5A1-T transformer module transforms the +200 Volt output of the AVO-5A1 mainframe to 100 Volts to 10 Ohm. The AVO-5A1-T module connects to the mainframe via a 50 Ohm miniature coaxial cable approx. 2 feet in length. The output terminals of the transformer module consists of a short length of microstrip transmission line protruding from the module chassis. The OUT terminal is the center conductor which is bounded on both sides by the ground plane (see below):

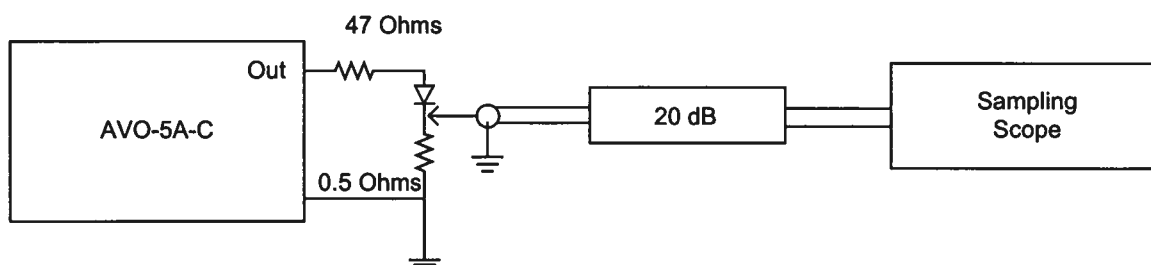


The diode load and series resistor (10 Ohm 1/4 W carbon composition resistor) should be connected between the OUT and GND terminals using very short leads (< 0.2 cm). The voltage across the resistor-diode load may be monitored by connecting a length of 80 mil semi-rigid 50 Ohm cable as shown below:



Take care to insure that during soldering the OUT conductor is not shorted to the chassis. Also, use minimal heat when soldering. The series resistor may be varied between about 7 to 15 Ohms with minimal waveform degradation.

- 10) A DC potential of -5 Volts (15 mA) should be applied to the -5 V terminal on the side of the AVO-5A1-T module. With this bias the output rise time is less than 600 ps. Without the bias, the output rise time will be just under 1.0 ns.
- 11) **CAUTION.** The AVO-5A1-T output module may be damaged if operated into an open circuit (i.e. without the 10-Ohm load) particularly if the output amplitude is set near max. If any open circuited load conditions is anticipated either turn off the prime power or set the amp control max CCW.
- 12) To obtain peak currents in the range of 0 to 4 Amperes the diode load in series with a 47 Ohm resistor may be connected directly on the output of the AVO-5 mainframe as shown below:

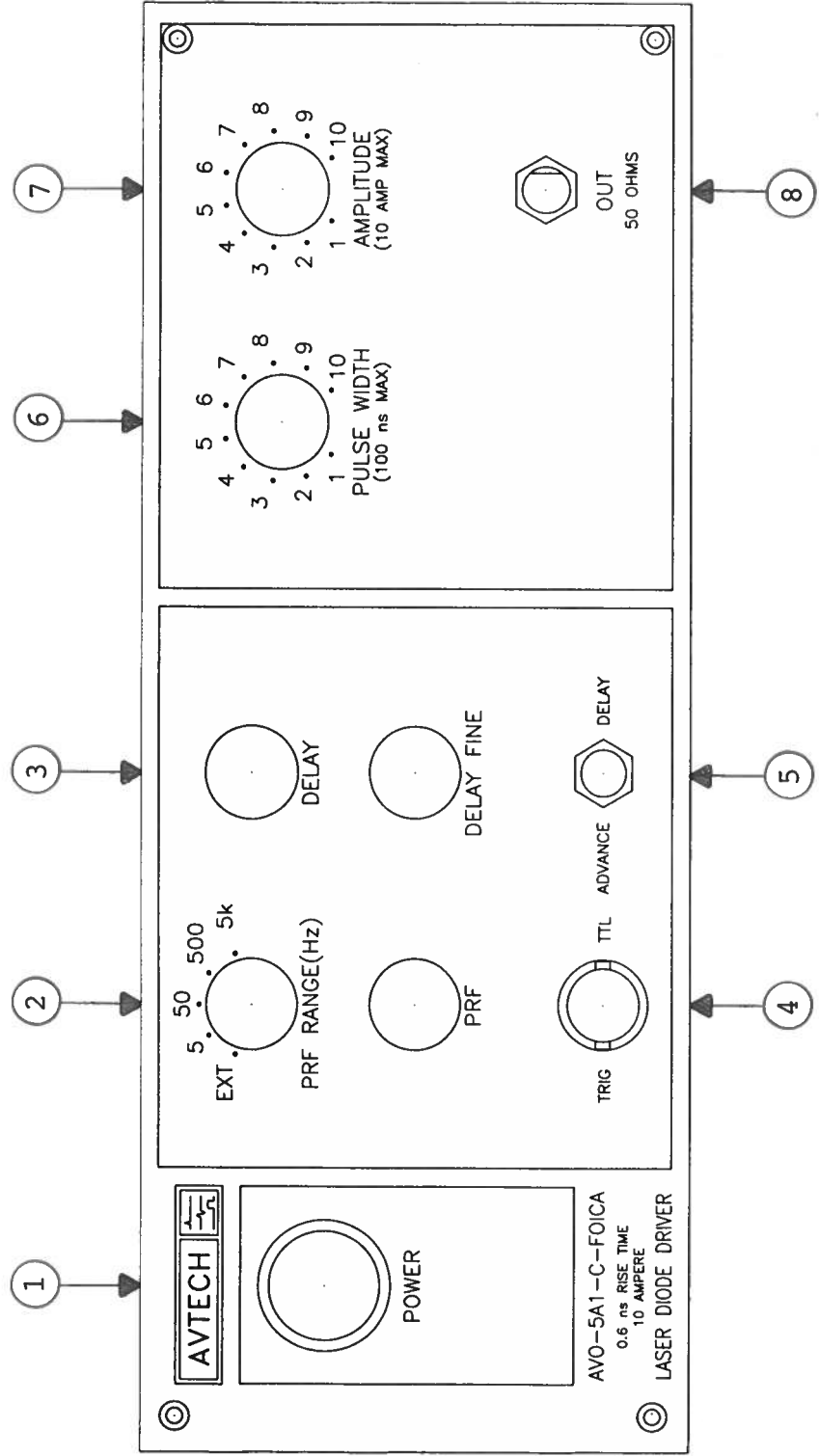


The output current may be observed by placing a 0.5 Ohm carbon composition resistor in series with the diode and placing a 50 Ohm cable across this resistor.

- 13) **NOTE:** The lifetime of the switching elements in the pulse generator module is proportional to the running time of the instrument. For this reason the prime power to the instrument should be turned off when the instrument is not in use. In the case of failure, the switching elements are easily replaced following the procedure described in the following section.
- 14) The 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.
- 15) For additional assistance:

Tel: (613) 226-5572
Fax: (613) 226-2802
Email: info@avtechpulse.com

FIG. 2: FRONT PANEL CONTROLS



FRONT PANEL CONTROLS

- (1) ON-OFF Switch. This is the main power switch. It applies basic prime power to all stages.
- (2) PRF Controls. With this range switch in the 5, 50, 500, or 5K positions, the pulse repetition frequency (PRF) of the instrument is controlled by the internal clock oscillator, which in turn is controlled by the PRF range switch and fine control.

With the range switch in the EXT position, the instrument requires a 50 ns (or wider) TTL level pulse applied at the TRIG input in order to trigger the output stages.

- (3) DELAY Control. These controls vary the relative delay between the reference output pulse provided at the TRIG output (4) and the main output (6). This delay is variable over the range of 0 to about 500 ns. Coarse and fine controls are provided. If the Advance/Delay switch (5) is set to "ADVANCE", the reference output on the TRIG output (4) precedes the main output (6). If the Advance/Delay switch (5) is set to "DELAY", the reference output on the TRIG output (4) lags the main output (6).

The delay is not adjustable when triggering externally.

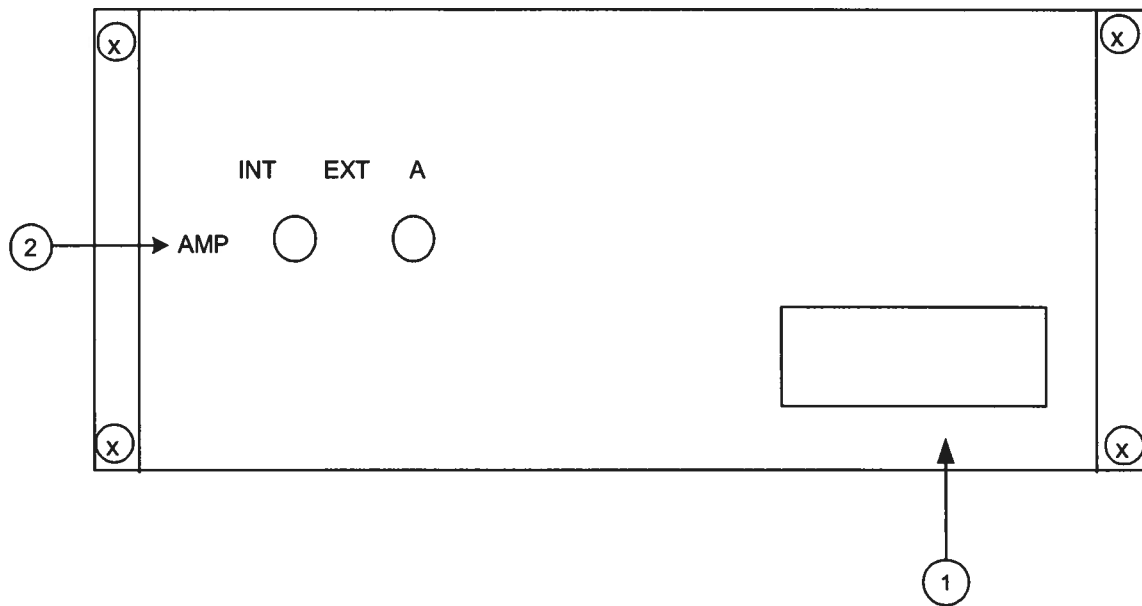
- (4) TRIG Connector. This connector has two functions. When triggered internally, this output provides a reference signal that can be used to trigger an oscilloscope scope time base. The output is a 2V, 200 ns (approx.) pulse capable of driving a 50-Ohm load. Set the scope to trigger on the positive edge.

When triggered externally (i.e., the PRF range switch is in the EXT position), the external TTL-level trigger signal is applied at this point.

- (5) ADVANCE/DELAY SWITCH. This switch determines whether the reference output pulse on the TRIG connector (4) occurs in before the main output pulse (ADVANCE mode), or whether the reference pulse occurs after the main output pulse (DELAY mode). This switch is only useful when triggering internally.
- (6) PW Control. A one-turn control which varies the output pulse width from 0 to 100 ns.
- (7) AMP Control. The output pulse amplitude is controlled by means of the one turn potentiometer (AMP).

- (8) OUT. SMA connector provides a positive output to a fifty-Ohm load (0 to 200 Volts). The 50-Ohm cable from the AVO-5A1-T modules connects to this point.

FIG. 3: BACK PANEL CONTROLS



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.

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.

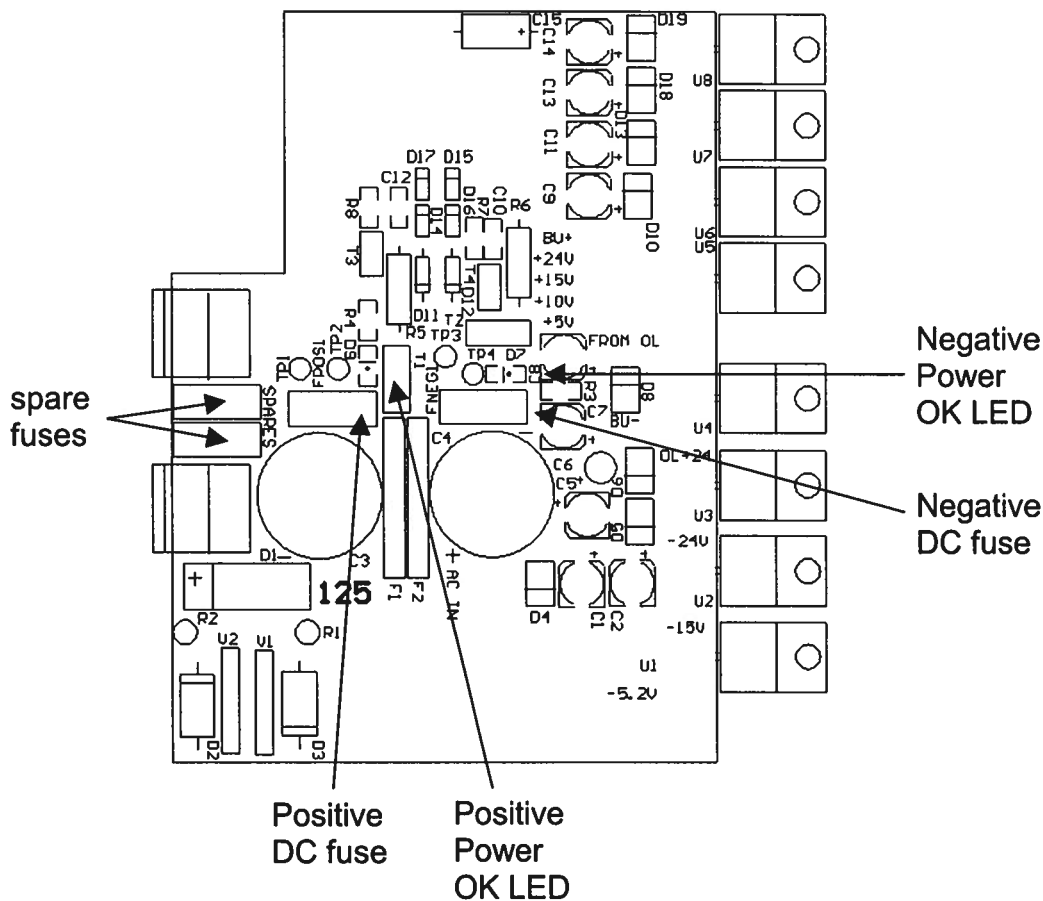
In the 120V setting, a 0.5A slow blow fuse is required. In the 240V setting, a 0.25A slow blow fuse is required.

- (2) AMP. To voltage control the output amplitude, set the switch in the EXT position and apply 0 to +10 V to BNC connector A ($R_{IN} > 10K$). (EA Option).

POWER SUPPLY AND FUSE REPLACEMENT

This instrument has three main fuses, plus two spares. 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 two spares) are located on the internal DC power supply, as shown below:



The four 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. 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. (Two spare 0.5 Amp fuses are provided on the circuit board. They may be transferred to the active fuse locations using needle-nose pliers.)

Sept. 27/2001
(edition 1)