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SINCE 1975

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## INSTRUCTIONS

**MODEL AVS-101-PS**

**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

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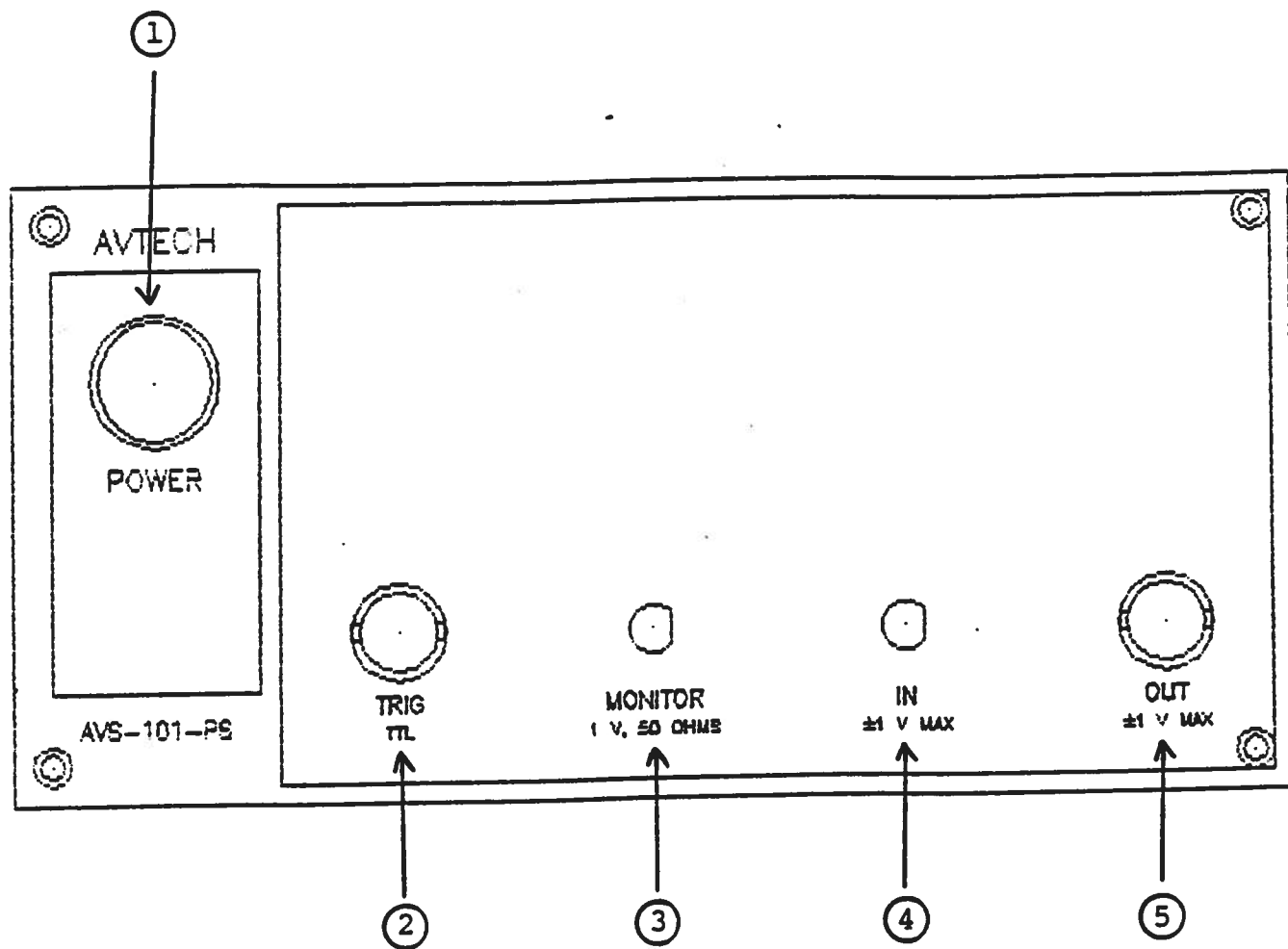
E-mail: [info@avtechpulse.com](mailto:info@avtechpulse.com)

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## TABLE OF CONTENTS

WARRANTY .....	2
TABLE OF CONTENTS .....	3
FIG. 1: FRONT PANEL CONTROLS.....	4
FRONT PANEL CONTROLS .....	5
FIG. 2: BACK PANEL CONTROLS .....	6
BACK PANEL CONTROLS .....	6
BACK PANEL CONTROLS .....	7
TIMING WAVEFORMS .....	8
TEST PROCEDURE AND OPERATION INSTRUCTIONS .....	9
AVS-101-PS BLOCK DIAGRAM .....	12
SYSTEM DESCRIPTION .....	13
POWER SUPPLY AND FUSE REPLACEMENT .....	14
PERFORMANCE CHECK SHEET .....	16

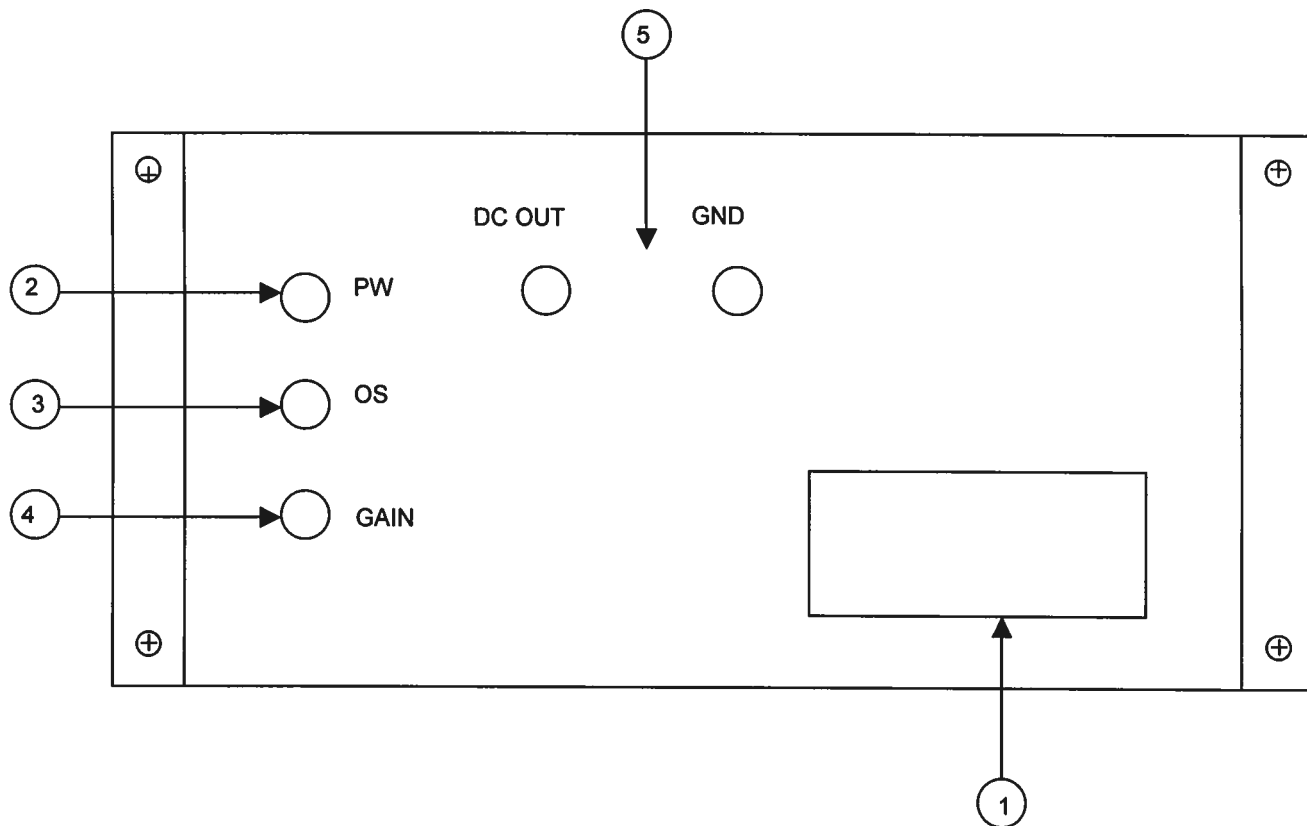
FIG. 1: FRONT PANEL CONTROLS



## FRONT PANEL CONTROLS

- (1) ON-OFF Switch. Applies prime power to all stages.
- (2) TRIGGER. BNC connector to which TTL level 50 ns to 1.0 us trigger pulse is applied to activate sampler. Sample is taken 35.5 ns after the leading edge of the input TRIGGER pulse.
- (3) M (MONITOR) Output. SMA connector provides a +1 volt replica of the sample pulse to a fifty-ohm load. The width of the M output pulse is controlled by the back panel PW control and is equal to the width of the sample pulse, which operates the sampling gate (4 to 20 ns). The M output appears 37.5 ns after the application of the TRIGGER pulse. The input signal is sampled 2 ns before the leading edge of the M output.
- (4) IN. SMA connector, fifty-ohm input impedance to which signal to be sampled is applied. Max input +1 volt.
- (5) OUT. BNC connector connects 3 us wide pulse output to fifty-Ohm load. Output amplitude equals IN amplitude (GAIN control adjusts this). DC offset when IN amplitude equals zero set to zero using OS control.

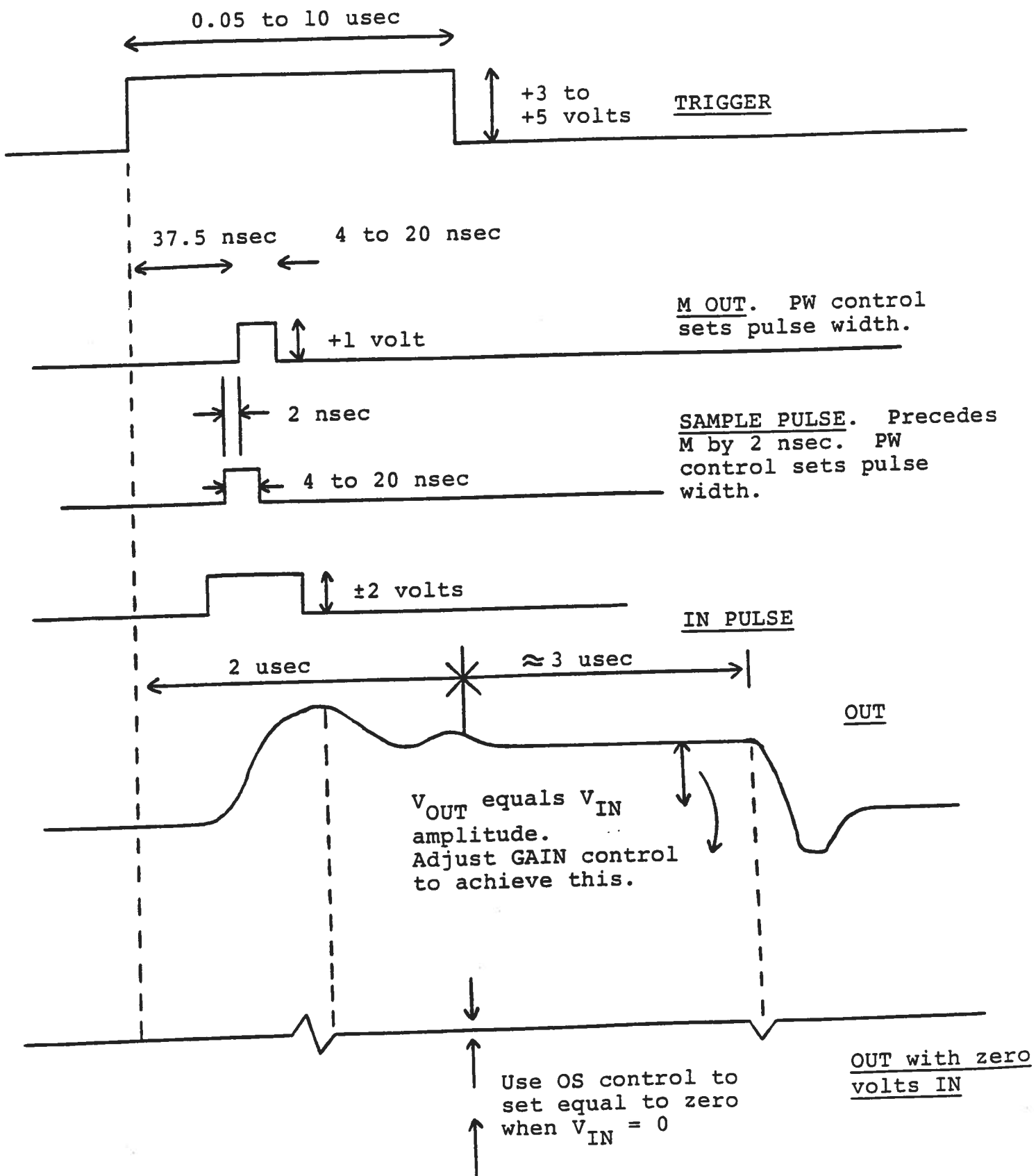
FIG. 2: BACK PANEL CONTROLS



## 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 (0.5 A SB).
- (2) PW Control. A one-turn control which varies the M (and sample) pulse width from 4 to 20 ns.
- (3) OS Control. A one-turn offset control used to set OUT amplitude equal to zero when IN amplitude equals zero.
- (4) GAIN Control. A one- turn control used to set OUT amplitude equal to IN amplitude.
- (5) DC OUT. DC output amplitude equals IN amplitude. GAIN control used to set output amplitude equal to N amplitude and OS control to set to zero when IN set to zero. Terminate in 1 K or higher impedance. Will withstand short-circuit load.

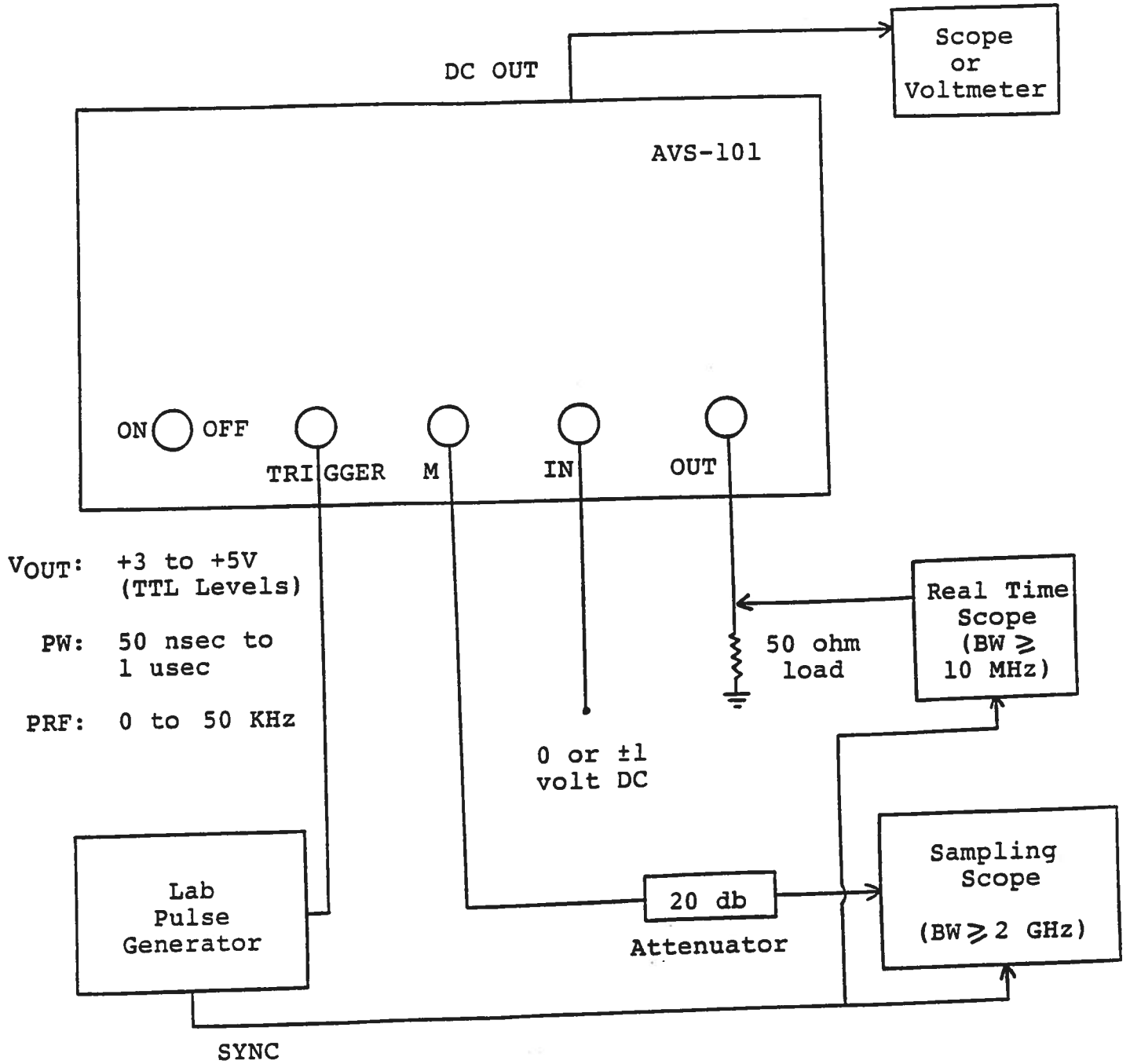
TIMING WAVEFORMS





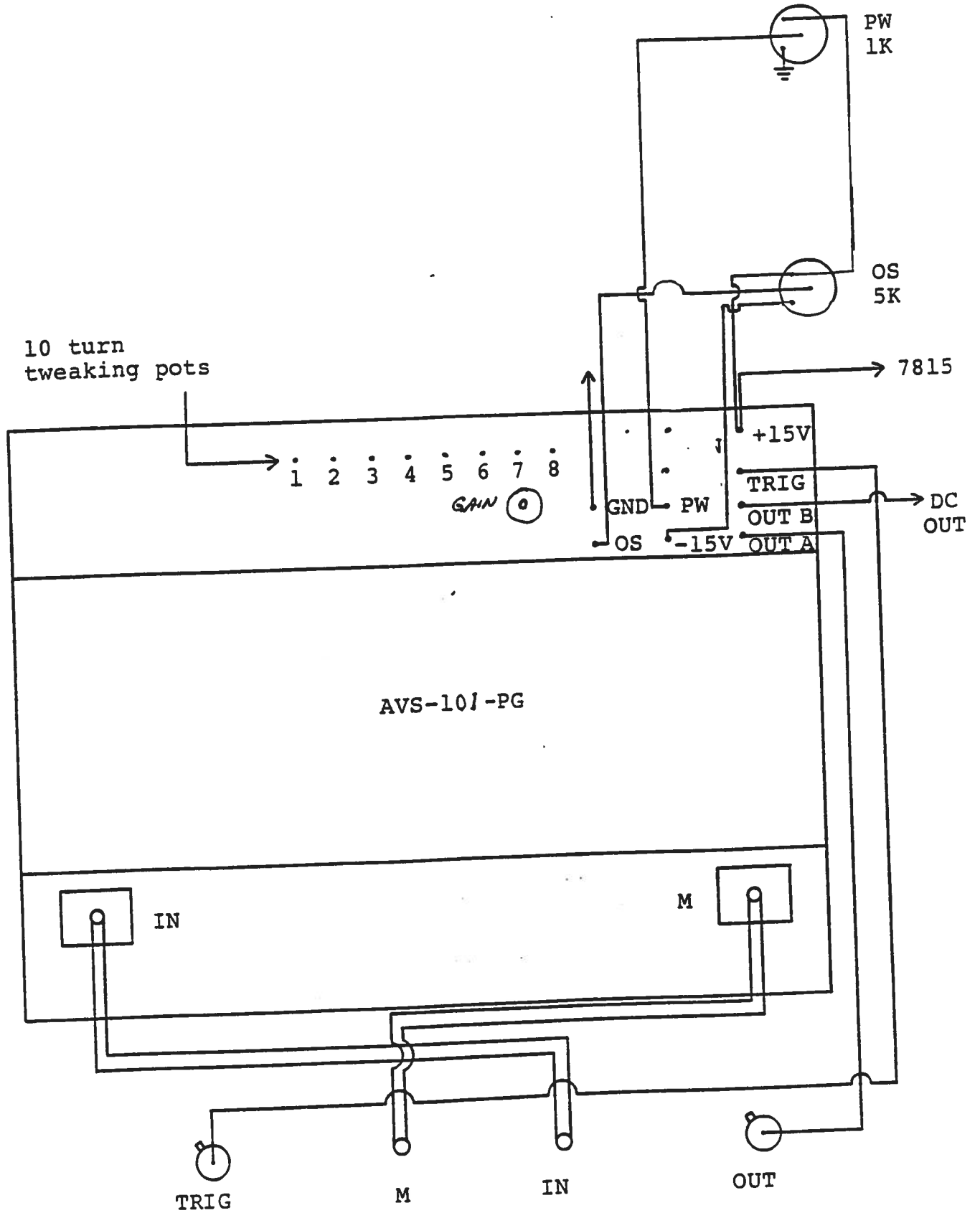
## TEST PROCEDURE AND OPERATION INSTRUCTIONS

- 1) It is recommended that the AVS-101 unit be first tested and calibrated using a DC input signal rather than a short pulse input signal so as to avoid the requirement of synchronizing the sampling pulse and the input pulse.
- 2) The following arrangement may be used for the DC test:



- 3) Apply prime power and with sampling scope and back panel PW control, set sampling pulse (or M) to desired width (see timing waveforms).
- 4) Apply 0 volts to IN input and use real time scope and OS control to set OUT level to approximately zero volts. (see timing waveforms).
- 5) Apply + or -1 volts to IN input and adjust GAIN control to obtain + or -1 volt at OUT point (see timing waveforms) and at the DC OUT point.
- 6) The unit is now calibrated. Note that if PW of sample pulse is changed, it will be necessary to reset the GAIN control. Increasing the PW increases the output amplitude thereby requiring that the GAIN control be turned counter clockwise to again set the OUT amplitude equal to the IN amplitude.
- 7) The unit may now be tested with a short pulse applied to the IN port. It should not be necessary to readjust the OS or GAIN controls. Note that if the amplitude of the input pulse is known (eg. determined using the sampling scope) the unit may be calibrated using only the short pulse rather than using the DC levels.
- 8) When operating properly, the pulse output should appear as a train of approx. 4 us pulses having the same polarity and amplitude as the nanosecond pulses applied at the IN port. The base line between the pulses should be near zero and constant (or horizontal). If the base line between the pulses is not constant it may not be possible to calibrate the unit as previously described or the output amplitude may be a function of the PRF. To adjust the inter pulse base line; remove the instrument top cover by removing the four Phillips screws on the back panel of the instrument. The top cover may then be slid off exposing the module in the interior. With the unit triggered, the prime power on and the IN voltage set to zero adjust pots 5, 6, 7 and 8 on the module until the OUT voltage is near zero and constant. Note that only very minor adjustments of the pots should be necessary.
- 9) As the PW sample width is varied from 4 to 20 ns, the OUT level during the 4 us pulse out interval may vary and it may not be possible to zero using the rear panel OS control. In such cases, a minor change in the PW control may make a zero output possible. If this is not possible then minor adjustment to pots 1 and 2 on the sampler module can be made to establish a zero output.

### AVS-101-PS BLOCK DIAGRAM



## SYSTEM DESCRIPTION

The AVS-101 comprises the following basic modules:

- 1) AVS-101-PG sampler
- 2) 110V 60 Hz to +15V power supply board

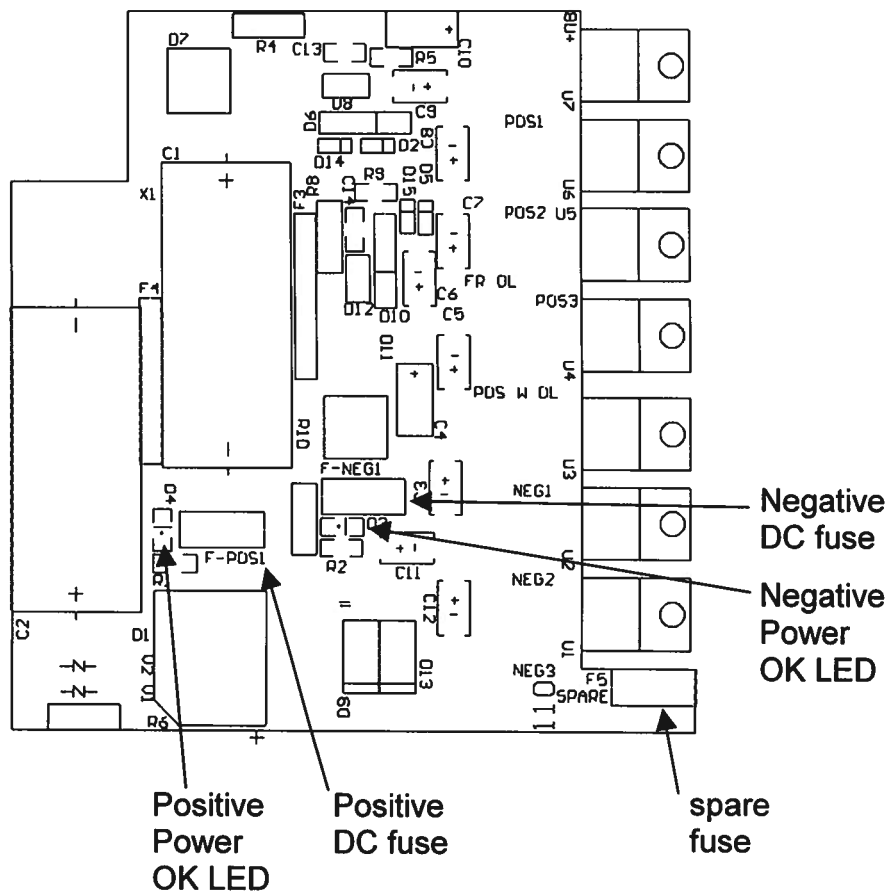
The modules are interconnected as shown in the preceding diagram.

The sampler attenuates the signal applied at the IN port and takes a 4 to 20 ns wide sample of this signal. The resulting sample voltage is stored on a small capacitor, which shunts a high impedance input amplifier. The capacitor is discharged to zero after 3.5  $\mu$ s by a shunting switch. Variable gain output amplifiers boost the capacitor voltage so that the peak output voltage equals the amplitude of the voltage applied to the IN terminal of the AVS-101 unit.

## 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.