

INSTRUCTIONS

MODEL AVL-3AH-C 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

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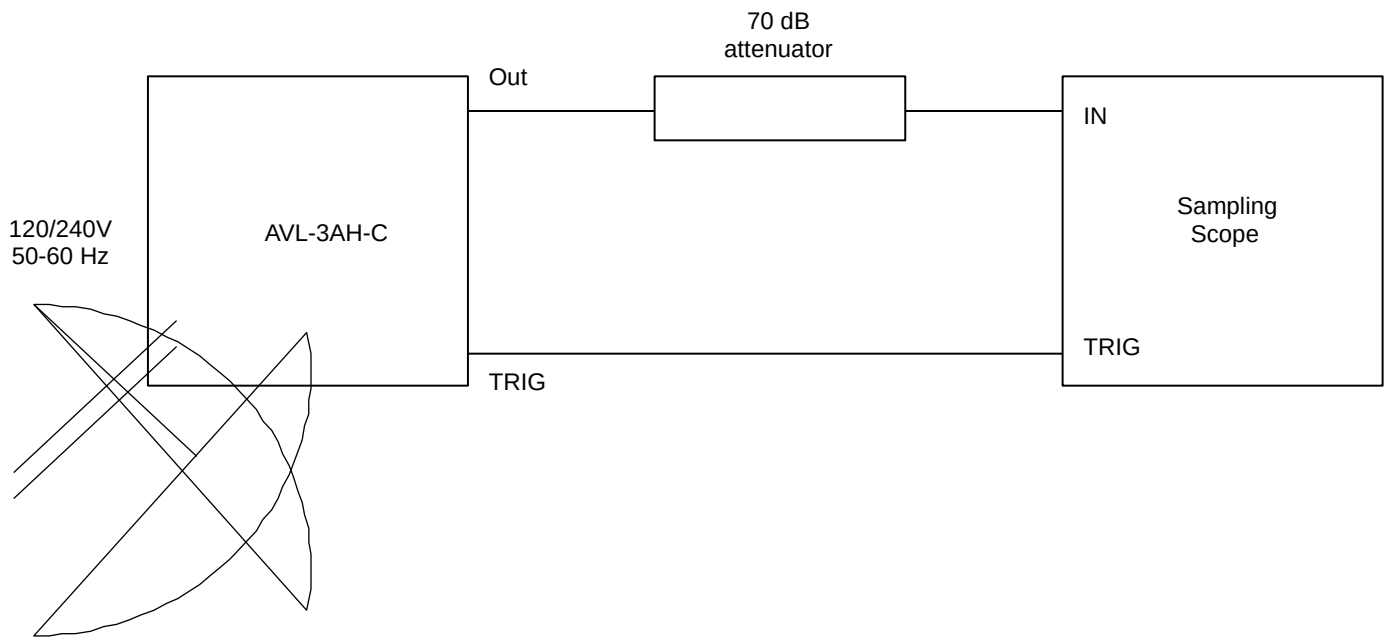
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FIG. 1: PULSE GENERATOR TEST ARRANGEMENT



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 70 dB attenuator at the sampling scope vertical input channel will insure a peak input signal to the sampling scope of less than one Volt. WARNING: Model AVL-2-C may provide a peak output power in excess of 4.0 KW. The peak power rating of the attenuator must exceed this limit.
- 3) The TRIG output channel provides TTL level signals (+3 Volts, 200 ns). 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.
- 4) To obtain a stable output display the PRF controls on the front panel should be set mid-range while the PRF switch may be in either range (but not in the EXT position). The front panel 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.
- 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) TR Control. The one turn TR control adjusts the shape of the leading edge of the output waveform. This control must be adjusted to minimize the rise time (after the pulse width has been adjusted). Note that the instrument may require an initial warm-up time of several minutes before the leading edge waveform stabilizes.
- 7) TF Control. The one turn TF control adjusts the shape of the falling edge of the output waveform. The control must be adjusted to minimize the fall time (after the pulse width has been adjusted).
- 8) The output pulse amplitude is controlled by means of the one turn potentiometer (AMP) and the HIGH-LOW switch adjacent to the AMP control. With the switch in the HIGH position, the output amplitude is variable over the range of 100 to 450 Volts while in the LOW position the output amplitude is variable over the range of about 0 to 320 Volts. For units with the -EA option the front panel AMP control must be set fully clockwise. The rear panel AMP switch should be set in the EXT position and 0 to +10 VDC applied to the "A" BNC Connector ($R_{IN} = 10k$).

- 9) An external clock may be used to control the output PRF of the AVL 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. For operation in this mode, the scope time base must also be triggered by the external clock. The propagation delay time in the externally triggered mode is about 350 ns.
WARNING: Model AVL-3AH may fail if triggered at a PRF greater than 5 kHz.
- 10) Model AVL-3AH can withstand an infinite VSWR on the output port but is intended for operation with 50 Ohm loads.
- 11) 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.
- 12) MONITOR OUT M. Provides an attenuated (x10) coincident replica of the main positive output pulse to 50-Ohms. (option).
- 13) 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.
- 14) For additional assistance:

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FIG. 2: FRONT PANEL CONTROLS

FRONT PANEL CONTROLS

- 1) ON-OFF Switch. Applies basic prime power to all stages.
- 2) PRF Control. 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 Output. 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 +3V, 200 ns (approx.) pulse capable of driving a 50-Ohm load. Set the scope to trigger on the positive edge.

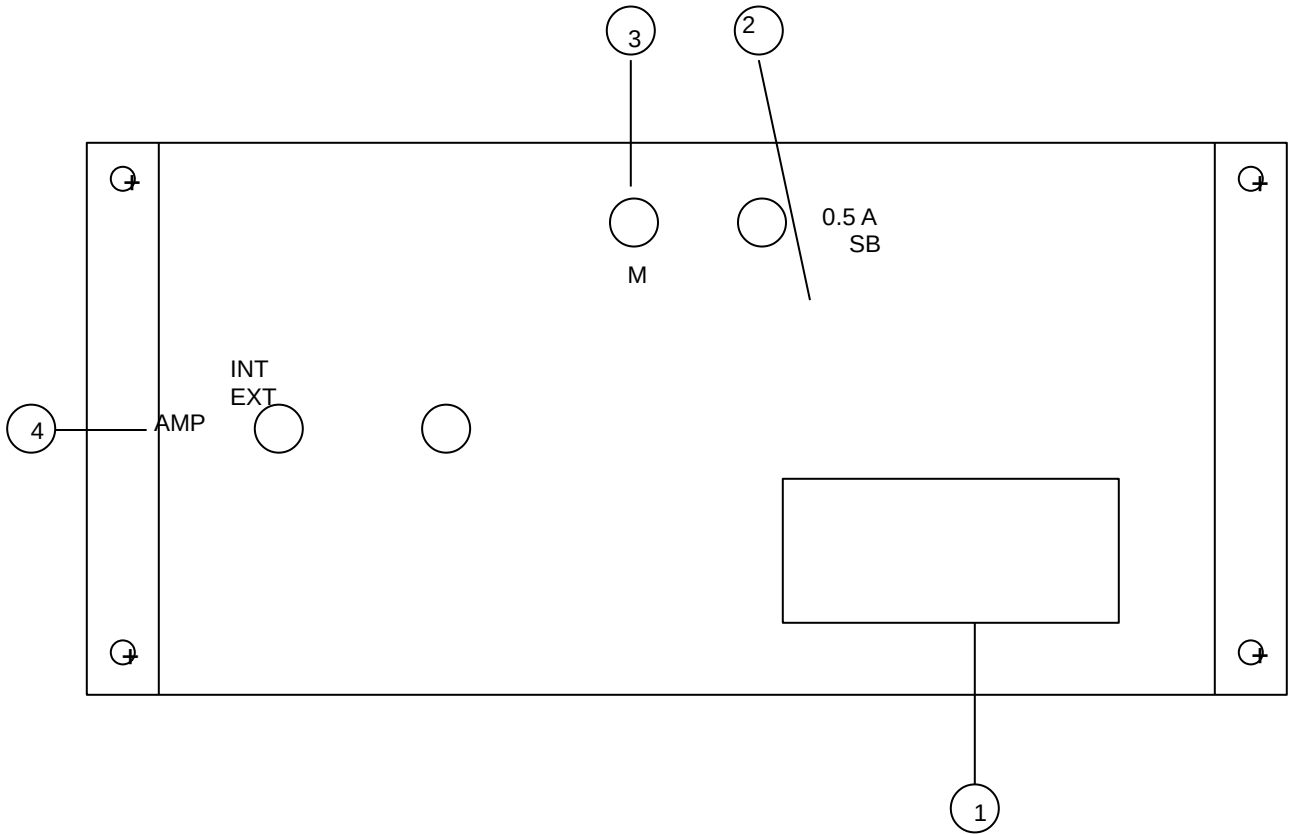
When triggered externally, (i.e., the PRF range switch is in the EXT position), the external TTL-level trigger signal is applied at this point.

- 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) TR Control. The one turn TR control adjusts the shape of the leading edge of the output waveform. This control must be adjusted to minimize the rise time (after the pulse width has been adjusted). Note that the instrument

may require an initial warm-up time of several minutes before the leading edge waveform stabilizes.

- 8) TF Control. The one turn TF control adjusts the shape of the falling edge of the output waveform. The control must be adjusted to minimize the fall time (after the pulse width has been adjusted).
- 9) AMP Control. The output pulse amplitude is controlled by means of the one-turn potentiometer (AMP) and the HIGH-LOW switch adjacent to the AMP control. With the switch in the HIGH position, the output amplitude is variable over the range of 100 to 450 Volts while in the LOW position the output amplitude is variable over the range of about 0 to 320 Volts.
- 10) OUT Connector. BNC connector provides output to a fifty Ohm load.

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.

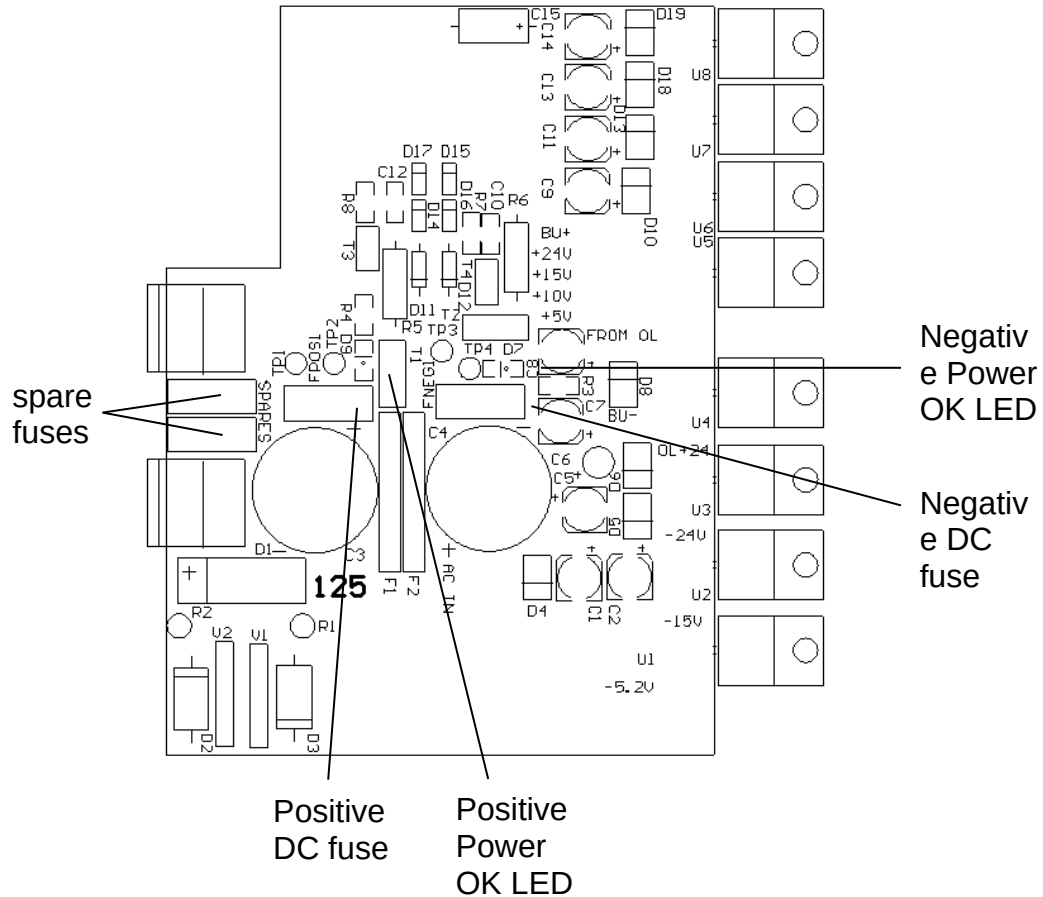
In the 120V setting, a 0.5A slow blow fuse is required. In the 240V setting, a 0.25A slow blow fuse is required.

- (2) 0.5 A SB. This fuse limits the amount of power supplied to the output stage.
- (3) MONITOR Output. The back monitor output provides an attenuated replica (20dB down) of the output. The monitor output is designed to operate into a 50 Ohm load. (Option).
- (4) To voltage control the output amplitude, set the switch in the EXT position and apply 0 to +10V to connector A (RIN >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 positive fuse and one of the spare fuses on this circuit board are 1A slow-blow fuses, Littlefuse part number R452001. (This fuse can be ordered from Digikey, www.digikey.com. The Digikey part number is F1343CT-ND). The negative fuse and the second spare fuse are 0.5A slow-blow fuses (Littlefuse R452.500, Digikey part number 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. (Spare 1 Amp and 0.5 Amp fuses are provided on the circuit board. They may be transferred to the active fuse locations using needle-nose pliers.)

PERFORMANCE CHECK SHEET