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INSTRUCTIONS

MODELS AVX-D-PS, AVX-D-2-PS, AVX-D-3-PS

LOW JITTER ANALOG DELAY GENERATORS

SERIAL NUMBER: _____

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 dissembled, 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.

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TABLE OF CONTENTS

Manual Reference: T:\instructword\avx-d\AVX-D, all -PS models, edition3.sxw.

INTRODUCTION

The three models in the AVX-D analog delay generator series feature low-jitter variable delays in the ranges of 30 ns to 150 ns (Model AVX-D-PS), 30 ns to 10 us (Model AVX-D-2-PS), and 1 us to 100 us (Model AVX-D-3-PS). Model AVX-D-PS offers a very low jitter of ± 10 ps. Model AVX-D-2-PS exhibits a jitter of ± 30 ps at the minimum delay setting, increasing to ± 300 ps at the maximum delay setting. The jitter for the longer-delay Model AVX-D-3-PS is specified as ± 300 ps.

All signals are TTL compatible and the output pulses will drive loads as low as 50 Ohms. The IN trigger pulse in all models is split into an output TRIG pulse (equal to the width of the IN pulse and delayed by < 20 ns) and an OUT pulse having a fixed width of about 250 ns. The delay between the leading edges of the IN and OUT pulses in Model AVX-D-PS (30 to 150 ns) is controlled by a ten-turn dial, while the delay in Models AVX-D-2-PS and AVX-D-3-PS (30 ns to 10 ms and 1 ms to 100 ms, respectively) is controlled by a ten-turn dial and a range switch.

This instrument is intended for use in research and development laboratories.

OPTIONAL FEATURES

The following option is available for the AVX-D-PS:

-ED option: Provides electronic control (0 to +10V) of the delay.

SPECIFICATIONS

Model:	AVX-D-PS	AVX-D-2-PS	AVX-D-3-PS
Delay range[1]:	30 ns to 150 ns	30 ns to 10 us (3-position range switch)	1 us to 100 us (2-position range switch)
Jitter (Ext trig in to pulse out):	± 10 ps	± 30 ps to ± 300 ps max	± 300 ps
Output amplitude:	+ 5 V (TTL) will drive 50 Ohm loads		
Trigger required:	Modules and -PS units: +5 Volt, 50 to 500 ns (TTL)		
OUT pulse width:	250 ns		
Trig PW:	Equals input PW		
PRF:	0 to 1 MHz	0 to 1 MHz (50% maximum duty cycle)	0 to 50 kHz (50% maximum duty cycle)
Connectors:	Out: BNC, Trig: BNC, In: BNC		
Power requirement:	120/240 Volts (switchable) 50 - 60 Hz		
Dimensions: (H x W x D)	100 mm x 215 mm x 375 mm (3.9" x 8.5" x 14.8")		

INSTALLATION

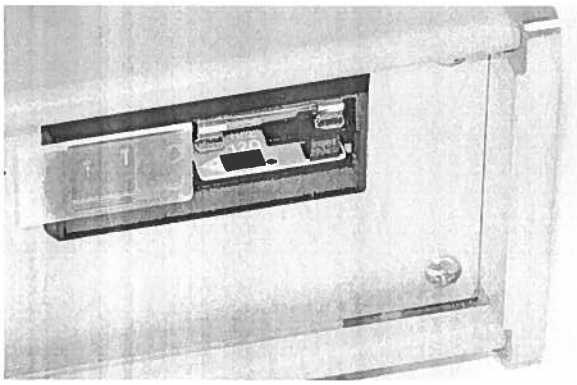
VISUAL CHECK

After unpacking the instrument, examine to ensure that it has not been damaged in shipment. Visually inspect all connectors, knobs, and handles. Confirm that a power cord is with the instrument. If the instrument has been damaged, file a claim immediately with the company that transported the instrument.

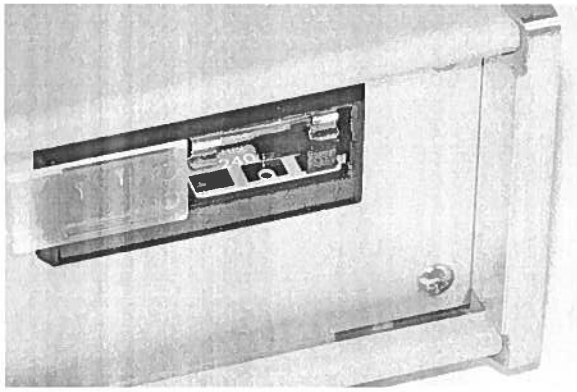
PLUGGING IN THE INSTRUMENT

Examine the rear of the instrument. There will be a male power receptacle, a fuse holder and the edge of the power selector card visible. Confirm that the power selector card is in the correct orientation.

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, as shown below:



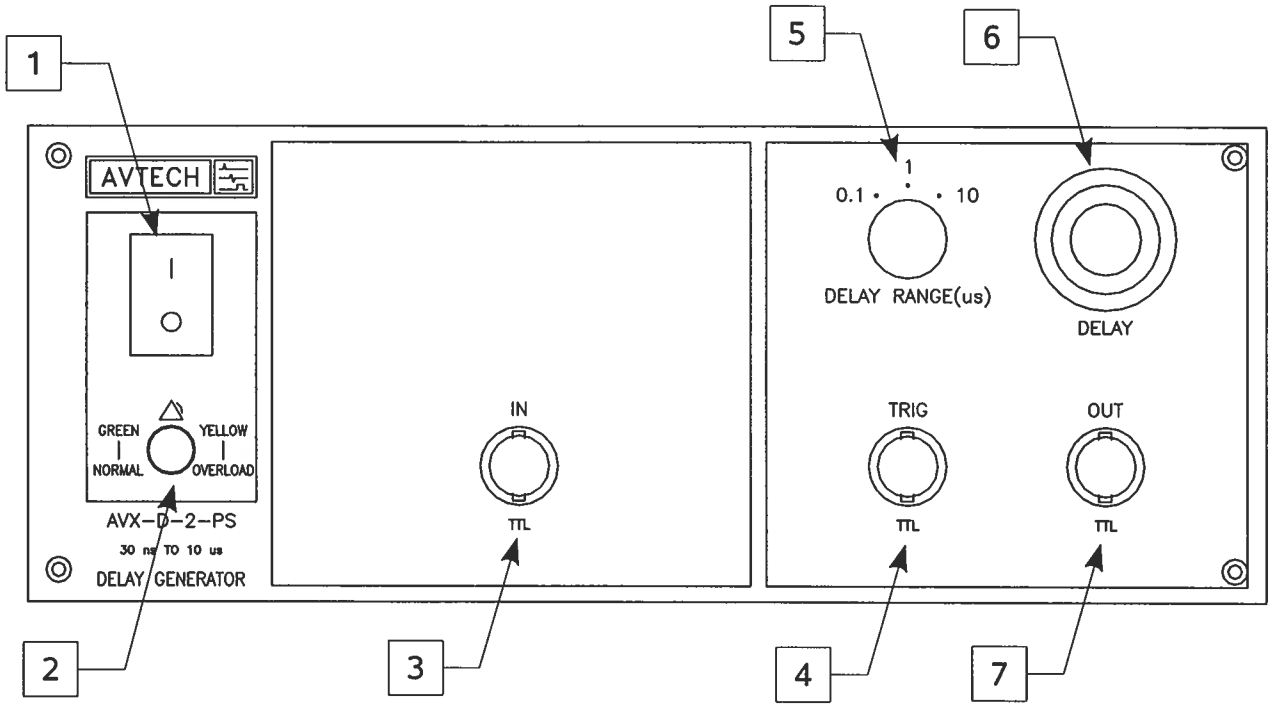
For AC line voltages of 220-240V, the power selector card should be installed so that the "240" marking is visible from the rear of the instrument, as shown below:



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 1/4A slow blow fuse is required. In the 240V setting, a 1/8A slow blow fuse is required.

FRONT PANEL CONTROLS



1. POWER Switch. This is the main power switch. When turning the instrument on, there may be a delay of several seconds before the instrument appears to respond.

2. OVERLOAD Indicator. When the instrument is powered, this indicator is normally green, indicating normal operation. If this indicator is yellow, an internal automatic overload protection circuit has been tripped. If the unit is overloaded (by operating at an exceedingly high duty cycle or by operating into a very low impedance), the protective circuit will disable the output of the instrument and turn the indicator light yellow. The light will stay yellow (i.e. output disabled) for about 5 seconds after which the instrument will attempt to re-enable the output (i.e. light green) for about 1 second. If the overload condition persists, the output will be disabled again (i.e. light yellow) for another 5 seconds. If the overload condition has been removed, the instrument will resume normal operation.

   This overload indicator may flash yellow briefly at start-up. This is not a cause for concern.

3. IN Connector. The TTL-level input signal (i.e. logic low = 0V, logic high = +3 to +5V) is applied to this BNC connector. The input pulse width must be 50 ns or wider.

4. TRIG Connector. A replica of the IN pulse appears on this output. This TTL-level output will drive loads of 50Ω or greater. The output pulse width is approximately equal to the input pulse width. The TRIG output is delayed by a fixed amount (< 20 ns) relative to the IN pulse.

5. DELAY Range Switch (AVX-D-2-PS and AVX-D-3-PS only). This range switch, in conjunction with the delay vernier (item 5) controls the delay of the OUT pulse relative to the IN pulse. The upper end of each range is marked on the switch positions.

   For the AVX-D-2-PS, the ranges are: 30 ns - 100 ns
   100 ns - 1 us
   1 us - 10 us

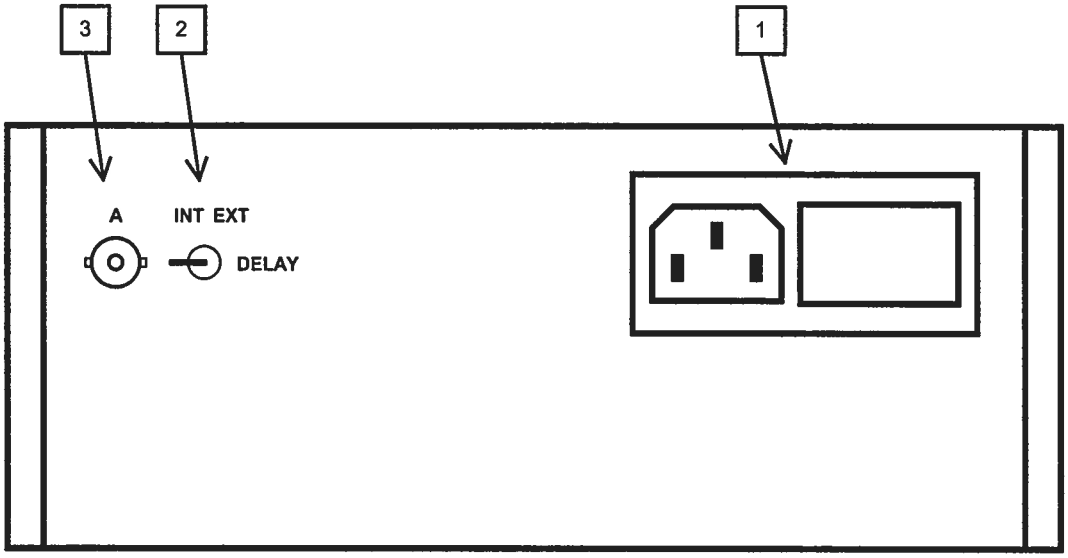
   For the AVX-D-3-PS, the ranges are: 1 us - 10 us
   10 us - 100 us

6. DELAY Vernier. This controls the delay of the OUT pulse relative to the IN pulse, in conjunction with the range switch (item 4, if present).

7. OUT Connector. This is the main output. The TTL-level pulses (i.e. logic low = 0V, logic high = +3 to +5V) are delayed relative to the input pulses on the IN connector (item 2) by a time set by the DELAY controls (items 4 and 5).

   The output pulse width is fixed at approximately 250 ns. This output will drive loads of 50Ω or greater.

REAR PANEL CONTROLS



1.AC POWER INPUT. A three-pronged recessed male connector is provided on the back panel for AC power connection to the instrument. Also contained in this assembly is a slow blow fuse and a removable card that can be removed and repositioned to switch between 120V AC in and 240V AC in.

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 1/4A slow blow fuse is required. In the 240V setting, a 1/8A slow blow fuse is required.

2.-ED Switch (Models With "-ED" Option Only). When this switch is in the "INT" position, the delay is controlled by the front panel controls. When this switch is in the "EXT" position, the voltage applied to the -ED Connector controls the delay.

3.-ED Connector (Models With "-ED" Option Only). When the -ED switch is in the "EXT" position, the voltage applied to this connector controls the delay. A voltage of zero corresponds to minimum delay, and +10V corresponds to maximum delay. The input impedance is approximately 10kΩ.

GENERAL INFORMATION

BASIC TIMING CONTROL

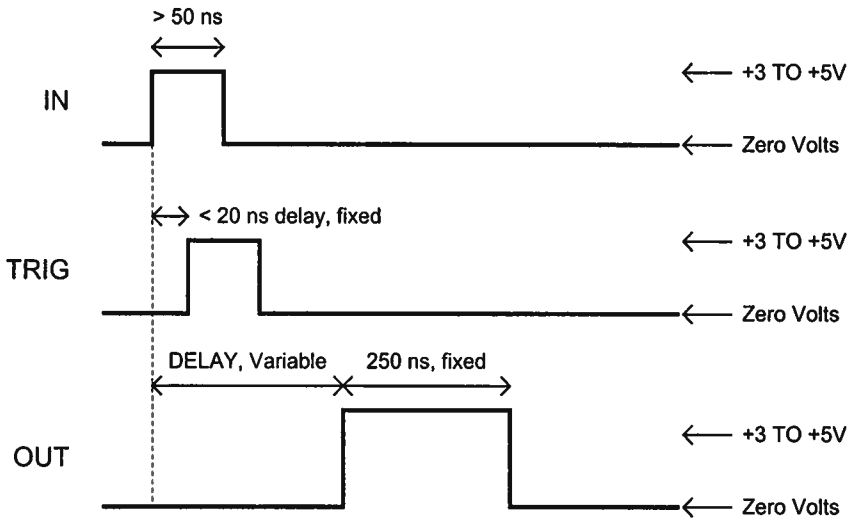
This instrument has one pulse input and two pulse outputs.

The TRIG output is delayed by a fixed amount (< 20 ns) relative to the IN pulse. The output pulse width is approximately equal to the input pulse width.

The OUT output is delayed relative to the input pulses on the IN connector by a time set by the DELAY controls. The output pulse width is fixed at approximately 250 ns.

Both outputs will drive loads of 50Ω or greater. All inputs and outputs operate at standard TTL logic levels (i.e. logic low = 0V, logic high = +3 to +5V).

The basic input and output waveforms are illustrated below:



Basic Operation

"-ED" OPTION

The IN-to-OUT delay on models with the "-ED" option can be controlled by the standard front-panel controls or by a DC voltage applied to a rear-panel connector. When the -ED switch is in the "EXT" position, the voltage applied to this connector controls the delay. A voltage of zero corresponds to minimum delay, and +10V corresponds to maximum delay. The input impedance is approximately 10kΩ.

TOP COVER REMOVAL

The interior of the instrument may be accessed by removing the four Phillips screws on the top panel. With the four screws removed, the top cover may be slid back (and off).

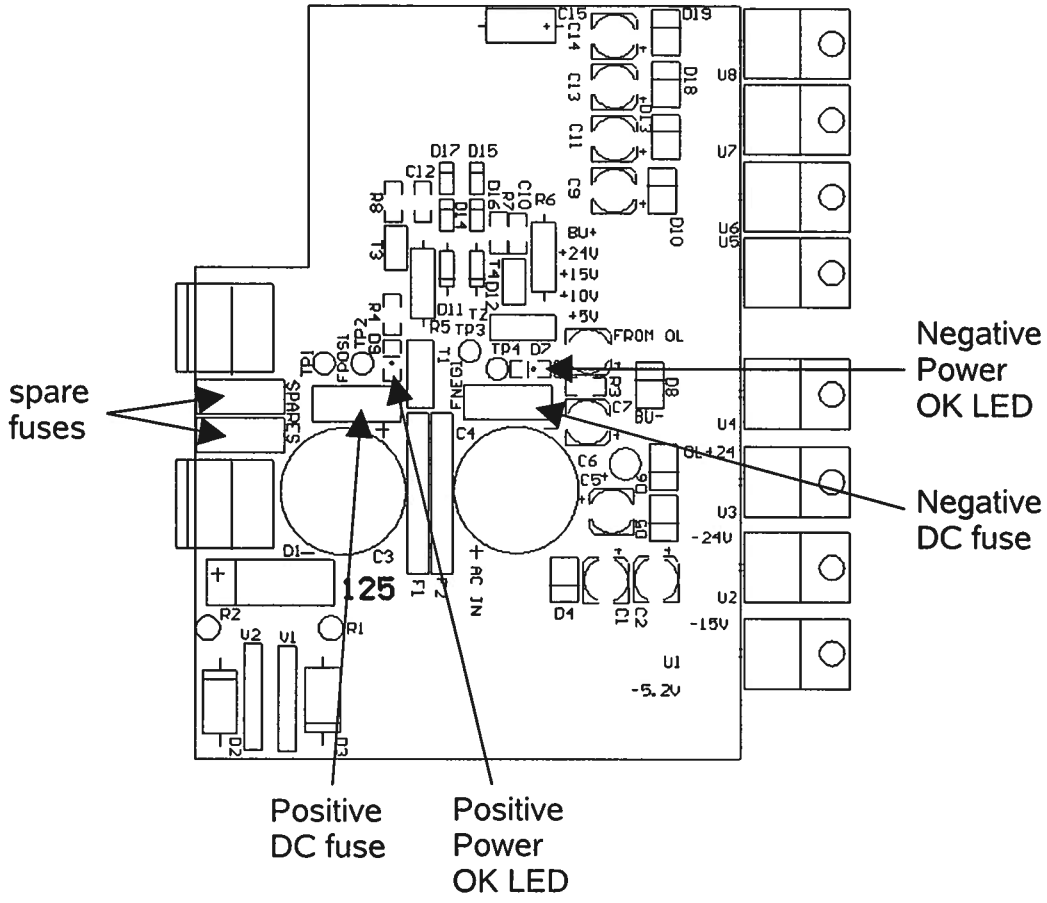
ELECTROMAGNETIC INTERFERENCE

To prevent electromagnetic interference with other equipment, all used outputs should be connected to shielded 50Ω loads using shielded 50Ω coaxial cables. Unused outputs should be terminated with shielded 50Ω BNC terminators or with shielded BNC dust caps, to prevent unintentional electromagnetic radiation. All cords and cables should be less than 3m in length.

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. 8/03