

- Variable delay of linear or logic signals
- Provides arrival time alignment for pulses in coincidence and gating systems
- Delay range: 0 to 4.75 ms
- Completely dc-coupled
- Rise time  $\leq 400$  ns

The Model 427A Delay Amplifier is suitable for any general-purpose variable delay of linear or logic signals within the range from 0.25 through 4.75  $\mu$ s. All signals, of either polarity and up to 10 V in amplitude, are delayed by the selected time and are reproduced at the outputs. Two outputs are included, one with an impedance nominally 1  $\Omega$  and the other 93  $\Omega$ .

The convenient switch-selectable steps of delay permit the time to be normalized between two or more signal paths to simplify coincidence and gating system adjustments. Each signal is subject to normal delays as it is processed through a signal path. The Model 427A can delay the earlier of two signals such that the pair of signals will coincide in a subsequent analysis.

The input impedance is not affected by the selected delay so that no signal loading change occurs. The dc-coupled input is furnished through a buffer amplifier that eliminates any interference from the delay selection network. The input impedance is more than 1 k $\Omega$ .

The Model 427A accommodates very high count rates without distortion because the instrument is completely dc-coupled. This, together with the fact that the gain from input to output is unity, ensure that the only function it will provide will be controlled delay for each signal furnished through it.

## PERFORMANCE

- Gain Unity**  $\pm 2\%$  at zero delay.
- Gain Variation with Delay** +10%, -2% for any combination of delays (1- $\mu$ s DRC-shaped pulse).
- Feedthrough and Delay Ripple**  $< 2\%$  (1- $\mu$ s DRC-shaped pulse).
- Delay Line Tolerances**  $\pm 5\%$ .
- Nonlinearity** Integral nonlinearity  $< \pm 0.05\%$  from 0.1 to 10 V.
- Temperature Instability** Gain shift of amplifier is  $< \pm 0.01\%$  / $^{\circ}$ C; an additional shift of -0.013% / $^{\circ}$ C should be expected for each  $\mu$ s of delay used.

## CONTROLS

- Linear Delay** Any combination of the following: 0.25, 0.5, 1.0, 1.0, and 2.0  $\mu$ s.
- Minimum (Zero) Delay** 60 ns.
- Maximum Delay** 4.75  $\mu$ s.

## INPUTS

- Polarity** Either positive or negative.
- Signal Span**  $\pm 10$  V linear range.
- Input Impedance**  $> 1$  k $\Omega$ , dc-coupled.
- Connector** Front-panel BNC.

## OUTPUTS

- Amplitude** Equal to input pulse amplitude; linear range 0 to  $\pm 10$  V; 0 to  $\pm 11$  V maximum.
- Output Impedance**  $\sim 1$   $\Omega$  front panel and 93  $\Omega$  rear panel.
- Connectors** Front- and rear-panel BNC.



## Rise Time and Bandwidth as a Function of Delay

Delay	Rise Time (ns)	Bandwidth (MHz)
0	280	1.25
0.25	280	1.25
0.5	290	1.20
1.0	310	1.13
2.0	340	1.03
3.0	360	0.972
4.0	370	0.945
4.5	380	0.920
4.75	400	0.875

**Operating Temperature** 0 to 50°C.

### ELECTRICAL AND MECHANICAL

**Power Required** +24 V, 30 mA; -24 V, 30 ma.

**Weight**

**Net** ~1.25 kg (2.6 lb)

**Shipping** ~2.60 kg (5.6 lb)

**Dimensions** Single-width NIM module 3.43 x 22.13 cm (1.35 x 8.714 in.) per DOE-ER/0457T.