

## EG&G ORTEC MODEL 566 TIME-TO-AMPLITUDE CONVERTER

### 1. DESCRIPTION

#### 1.1. PURPOSE AND FEATURES

The EG&G ORTEC 566 Time-to-Amplitude Converter (TAC) is a single-width NIM-standard module that measures the time interval between pulses to its start and stop inputs and generates an analog output pulse proportional to the measured time. Timing experiments requiring time ranges of 50 ns to 2 ms (10 ns to 2 ms usable time range) may be performed giving the experimenter flexibility in analyzing random nuclear events that occur within a selected time range. Time ranges from 50 ns to 2 ms are provided via the front panel controls.

The 566 Start input can be inhibited by a pulse or a dc level at the rear panel Gate In input connector.

Valid Start and Valid Conversion outputs are provided on the rear panel for each accepted start and stop input respectively. The duration of the Valid Start output indicates the interval from the accepted start until the end of reset. Valid Conversion occurs from the end of the internal delay after stop to the end of reset.

The selectable TAC output width and variable delay, which are easily adjustable, further serve to make the 566 a flexible instrument that can be easily adapted into many time spectroscopy systems. The output of the TAC may be synchronized with the stop signal or an external strobe signal to further enhance its versatility.

The 566 is dc-coupled and gated so that input count rates will not paralyze or otherwise hinder normal operation. The TAC output should be connected to the dc-coupled input of a multichannel analyzer (MCA) for optimum high-count-rate performance.

#### 1.2. OPERATION

Start-to-stop time conversion is accomplished only after a valid start has been identified and after a stop pulse has arrived within the selected time range. The start input is disabled during the busy interval to prohibit pileup; the stop input is disabled after the first accepted stop signal. The input gate for the start circuit can be operated in either an anticoincidence or a coincidence mode.

Time ranges may be switch-selected for full-scale intervals from 50 ns to 2 ms. Each time measurement is analog-

stored in a low-loss stretcher amplifier until a linear gate is opened by either an internal or an external strobe. The internal strobe can be obtained from either the start or the stop input pulse and in either case occurs automatically at a selected delay following the reference. An external strobe can be used for a prompt output at the strobe time provided that a time measurement has been completed and reset has not occurred. If reset occurs before a strobe, no TAC output signal is available. Reset also occurs if the start-to-stop time interval exceeds the range that is selected.

#### 1.3. LOGIC

An input can be accepted through the Start input connector on the front panel unless the 566 is busy processing a previous set of information or the response is inhibited by a gate input condition. The acceptance of a start input is essential in order to initiate a response in the 566. When a start input is accepted, a positive logic signal is available through the rear panel Valid Start output connector and is continued until the leading edge of a subsequent reset. The reset can be caused by a TAC output or by the sensing of an overrange condition. The start signal permits the internal circuits to start measuring a time interval and enables the stop input circuit.

The Stop input BNC can accept an input signal after it has been enabled by the start condition. It may be enabled immediately after start. When a stop input signal is accepted, this indicates that an interval has been measured and its analog equivalent is stored and available. A signal is furnished through the Valid Converter output that continues until the leading edge of a subsequent reset. If no stop input is accepted before an overrange condition is sensed, the measurement will be aborted and no output signals for the TAC will be generated.

The TAC output must be strobed. The source of the strobe can be switch-selected from the internal signal or from an external signal. If internal is selected, the strobe occurs after a delay that has been adjusted with the front panel TAC Output delay control, 0.5  $\mu$ s to 10.5  $\mu$ s after the leading edge of the signal. If the Strobe switch is set at Ext, a signal must be furnished through the Strobe Ext BNC connector to strobe the output promptly.