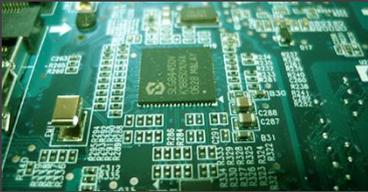




Innovator In Spectroscopy Equipment

# TSCA2028



## TIMING SINGLE CHANNEL ANALYSER MODEL TSCA2028

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# TIMING SINGLE CHANNEL ANALYSER

## MODEL TSCA2028

### Features

- Single channel analyzer and timing signal derivation
- Trailing edge constant fraction timing provides walk <math>< \pm 3\text{ns}</math> for 100:1 dynamic
- DC-coupled
- Integral, normal and window modes
- Adjustable delay 0.1 to 11 $\mu\text{s}$
- Provision for external baseline sweep
- Separate lower level and upper level discriminator outputs
- Excellent temperature stability
- High stability
- Being robust and suitable for use in challenging conditions
- Splash resistant design
- Wide operational temperature range
- Ultra reliable industry standard design

**100:1 Dynamic**  
**Separate Lower Level and**  
**Upper Level Discriminator**  
**Outputs**



## Description

The TSCA2028 from Control Farayand Pasargad (CFP) is a timing single channel analyzer performs the dual functions of single channel pulse height analysis and timing signal derivation. With SCAs that utilize leading edge timing, the rise time of the input pulses causes degradation of time resolution because the pulses have varying amplitudes. Constant fraction timing compensates for varying amplitudes and essentially eliminates this timing shift, giving consistently better timing results. For the internally set 50% fraction, the output occurs soon after the midpoint on the linear input trailing edge to facilitate gating and accumulation of data at very high input rates. This technique also minimizes timing shift and dead time when used with sodium iodide, silicon, and germanium detectors, thereby allowing better system time resolution and higher counting rates. The constant fraction technique makes it possible to realize significant improvements in time resolution in most timing applications. Notice that analysis is made of the main amplifier output. This technique allows optimization of time resolution and extension of dynamic range for neutron-gamma discrimination and other timing applications. Walk of < 3ns for 100:1 dynamic range using input pulses from a pulse is possible. The model 2028 is versatile, with three basic operating modes provided. In the Window mode, the unit operates as a high resolution, narrow (0 to 10%) window single channel analyzer. For wide window applications, the normal mode is used. In this mode the upper level and lower level controls are independently variable from 0 to 10V and an output is generated for pulses analyzed between the levels. Through use of the separate rear-panel LL Out and UL Out outputs, the unit can operate as a dual wide dynamic range integral discriminator for leading edge timing or for pulse routing. The dc-coupled input of the TSCA2028 makes it possible to take full advantage of the baseline restoration of the main amplifier for maximum performance at widely varying counting rates. The continuously adjustable output delay (two ranges covering 0.1 to 11 $\mu$ s) makes it possible to align output signals that have actual time differences without a need for additional delay devices or modules. Alternatively, an external strobe input can be used to cause an SCA output at the desired time. For an application where it is desirable to scan an entire spectrum, an external base line sweep input is provided via the rear-panel LL Ref Ext BNC connector. In this mode of operation, the baseline (lower level threshold) on which a window is riding is swept through an energy range and the count rate is recorded as a function of energy.

## Specifications

### Input(s)

#### Input power

TSCA2028 powered from a standard NIM bin and power supply.

#### DC INPUT

Front-panel dc-coupled BNC connector accept positive unipolar bipolar signal, 0 to +10V linear range,  $\pm 12V$  maximum; width 100ns; 1000 $\Omega$  input impedance.

#### AC IN

Rear-panel ac-coupled BNC connector accepts positive unipolar or bipolar signal, 0 to +10V linear range,  $\pm 100V$  maximum; width 0.2 to 10 $\mu$ s; 1000  $\Omega$  input impedance.

#### LL REF IN

When the rear-panel LL REF mode switch is on EXT, the rear-panel LL REF EXT BNC connector accepts the lower level biasing (an input of 0 to -10V on this connector corresponds to a range of 0 to 10V for the lower-level discriminator setting). Input protected to  $\pm 24V$

#### EXT STROBE IN

When the rear-panel EXT/INT STROBE locking toggle switch is in EXT, the rear-panel EXT STROBE IN BNC connector accepts a positive NIM-standard input, nominally +5V, 500ns wide, to cause an output to occur from the SCA.

The external strobe should be given within 5 $\mu$ s (or 50 $\mu$ s as determined by the front-panel delay control) of the linear input. At the end of this period, the TSCA2028 resets its internal logic without producing an output signal.

#### Output(s)

#### NEG OUT

Front-panel BNC connector provides fast NIM-standard output, nominally -16mA (-800mV on 50  $\Omega$  load); width  $\leq 20$ ns; rise time  $\leq 5$ ns;  $\leq 10 \Omega$  output impedance. Output occurs at the midpoint of the linear trailing edge plus the output delay as selected by the front-panel controls.

#### POS OUT

Front-panel BNC connectors provide positive NIM-standard output, nominally +5V; 500ns wide; 10  $\Omega$  output impedance. For internal strobe the output occurs at the midpoint of the linear input trailing edge plus the output delay as selected by the front-panel controls. For external strobe the output occurs at the time of strobe signal.

#### LL OUT

Rear-panel BNC connector provides positive NIM-standard output, nominally +5V, 500ns wide;  $\leq 10 \Omega$  output impedance. Output occurs as leading edge of linear input crosses the LL threshold.

#### UL OUT

Rear-panel BNC connector provides NIM-standard output, nominally +5V, 500ns wide;  $\leq 10 \Omega$  output impedance. Output occurs as leading edge of linear input crosses the UL threshold.

#### Control(s)

#### WINDOW OR UPPER LEVEL

Front-panel 10-turn potentiometer determines the window width (0 to +1V) in the window mode or the upper-level (0 to +10V) threshold in the normal mode. This control is disabled in the Integral mode.

#### LOWER LEVEL

Front-panel 10-turn potentiometer adjustable from 0 to 10V; when the rear-panel LL REF mode switch is set on INT,

determines the threshold setting for the lower level discriminator. When the LL REF mode switch on the rear panel is in the EXT position, this control is ineffective.

#### INT/NOR/WIN

Front-panel 3-position locking toggle switch selects one of three operating modes:

Integral: LL sets a single-discriminator threshold (0 to +10V) and UL is disabled.

Normal: UL and LL are independently adjustable levels (0 to +10V).

Window: LL sets the baseline level (0 to +10V) and UL sets the window width (0 to +1V).

#### DELAY[ $\mu$ s]

Front-panel 10-turn potentiometer for continuous adjustment of output delay over selected range. In the external strobe mode, the delay control adjusts the automatic reset time from 5 $\mu$ s to 50 $\mu$ s.

#### DELAY

Front-panel locking toggle switch selects delay ranges of 0.1 to 1.1 $\mu$ s or 1.0 to 11 $\mu$ s.

#### WALK ADJ

Front-panel screwdriver adjustment for precise setting of walk compensation.

#### LL REF

Rear-panel 2-position locking toggle switch selects either the front-panel LL potentiometer or the voltage signal applied to the rear-panel LL REF EXT connector as the LL discriminator reference threshold.

#### STROBE

Rear-panel 2-position locking toggle switch selects either internal or external source for the SCA output signal strobe function.

#### Indicator(s)

No indicator

#### Performance

Dynamic range

100:1

Pulse-pair resolving time

Output pulse width plus delay (as selected by the front-panel delay controls), plus 100ns for fast NIM output or plus 200ns for positive NIM output. Minimum resolving time for negative output 220ns; for positive output 800ns.

Threshold temperature instability

$\pm 0.01\%/^{\circ}\text{C}$  of full scale, 0 to 50 $^{\circ}\text{C}$  using a NIM class A power supply (referenced to -12 V).

Delay temperature instability

$\leq \pm 0.03\%/^{\circ}\text{C}$  of full scale, 0 to 50 $^{\circ}\text{C}$ .

Discriminator nonlinearity

$\leq \pm 0.25\%$  of full scale (integral) for both discriminators.

Window width constancy

$\leq \pm 0.1\%$  variation of full-scale window width over the linear range 0 to 10V.

Minimum input threshold

50mV for lower-level discriminator.

## Application

- spectroscopy
- Gamma – Gamma coincidence
- Scientific
- General laboratory usage



## Electrical and Mechanical

### Unit: TSCA2028

#### Electrical

Power required	Its power from a NIM bin power supply. Required dc voltages and currents are +24V, 90mA; -24 V, 50mA; +12V, 110mA and -12V, 160mA.
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#### Physical

Dimensions (L x W x H)	220mm x 34mm x 248mm (L x W x H)
Net Weight	1.150kg
Box Weight	1.320kg

Mechanical			
	Unit: mm		

#### Environmental

Storage temperature	- 10°C to + 50°C
Operating temperature	0°C to +50°C
Relative humidity	< 80%

## Software and user interface

The device doesn't have any software

## Ordering info

## LFOUT2037 Standard package includes

Part #	Image	Description
TSCA2028 main		Timing single channel analyser model TSCA2028
ACCE2028001		CD user guide (1 Pack)
ACCE2028002		Box with foam insert
ACCE2028003*		Guaranty (one year)

\* =we stand behind our products. We guarantee your satisfaction in the quality of our instruments by providing a complete one-year warranty covering any defect of workmanship, material, and/or design. If our products do not perform, we will provide complete repair and/or replacement. for guaranty conditions, please refer to manual device (TSCA2028 - Manual)

## Optional accessories and services

Part #	Image	Description
ACCE2028004		Installation
ACCE2028005		Training
ACCE2028006**		Re-Calibration (interval) services. 1year factory maintenance suggested, not required
ACCE2028011		BNC terminator 50 $\Omega$
ACCE2028012		RG58A/U, 50 $\Omega$ cable with two BNC male plugs
ACCE2028013		RG59, 50 $\Omega$ cable with two SHV male plugs
ACCE2028014		Conn housing plug 50POS AMP connectors
ACCE2028015		Conn pin hood int 50pos panel MT
ACCE2028016		Guide pin 4-40
ACCE2028017		TE connectivity AMP connectors MultiMate, type II series pin

ACCE2028018		Bin guide pin
ACCE2028019		Guide socket

\*\* = The proper maintenance & calibration of your instruments is critical to ensure proper performance & accuracy. for Re-calibration (interval) services, please call with CFP company (021- 460453)





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