CFP

Innovator In Spectroscopy Equipment

TAC2038
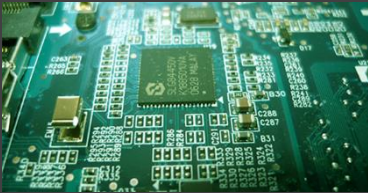
TIME TO AMPLITUDE CONVERTER MODEL TAC2038

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CATALOG

NIM

NIM MODULE

FREE DOWNLOAD

TIME TO AMPLITUDE CONVERTER
MODEL TAC2038

- Usable time range: 10 ns to 1ms (2ms optional)
- 15 ranges of Time-to-Amplitude Conversion
- Valid Start and Valid Conversion outputs
- Output synchronized with a stop or external strobe signal
- Provision to reject unwanted start input signals
- Positive or negative input signals
- Selectable output delay and width

**Positive or negative
input signals
Valid Start and
Valid Conversion outputs**

Description

The Model 2038 Time-to-Amplitude Converter generates a rectangular output pulse whose peak amplitude is linearly proportional to the time interval between a START and STOP input pulse pair. The Model 2038 is flexible for your nuclear timing analysis needs. The basic Time-to-Amplitude Conversion (TAC) analyzes the time relationships between random events, such as nuclear decay, that occur within a selected interval of time. The Model 2038 is ideal for time of flight, positron lifetime, pulse shape analysis in particle studies, and pulse pair timing in position-sensitive detector systems. To meet these needs, the Model 2038 offers 15 time ranges from 10ns to 1ms (2m opt).

The positive unipolar TAC output is essentially flat topped for accurate measurement by an analog-to digital converter (ADC). The Model 2038's start input can be inhibited by a pulse or a dc level at the rear-panel Gate Input connector. Valid Start and Valid Conversion outputs are provided 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. The Valid Conversion output 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 adjusted, further serve to make the Model 2038 a flexible instrument, 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 Model 2038 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 for optimum high count- rate performance.

Specifications

Inputs

All four inputs listed below are dc-coupled, edge triggered, and printed wiring board (PWB) jumper selectable to accept either negative or positive NIM standard signals. Input impedance is 50Ω in the negative position and >1kΩ in the positive position. The threshold is nominally -400 mV in the negative position and +2 V in the positive position.

Strobe

Front-panel BNC connector provides an external means to strobe a valid output signal from the TAC in the Ext Strobe mode. The input signal, exceeding threshold within the Ext Strobe reset interval after the Stop input, initiates the read cycle for the linear gate to the TAC output. Factory-set in the positive input position. Ext Strobe reset interval has a minimum value of ~0.5 μs and a maximum value of nominally 10 μs.

Start

Front-panel BNC connector initiates time conversion when Start input signal exceeds threshold. Factory-set in the negative input position.

Stop

Front-panel BNC connector terminates time conversion when Stop input signal exceeds threshold. Factory-set in the negative input position.

Gate

Rear-panel BNC connector provides an external means of gating the Start circuitry in either Coincidence or Anticoincidence with the Start input signal. Gate input signal must cross threshold $\geq$10ns prior to the Start input signal and must overlap the trigger edge of the Start input signal. Factory-set in the positive input position.

Outputs

TAC Output

Width Adjustable by PWB potentiometer from $\leq$1μs to $\geq$3 μs.

Impedance Z$_0$<10Ω. Rise Time ~250ns. Fall Time ~250ns.

Front-panel BNC connector provides unipolar pulse.

Amplitude 0V to +10V proportional to Start/Stop input time difference.

Time End of delay period in Int Strobe mode; prompt with Strobe input in Ext Strobe mode.

Valid ST

Amplitude Nominally +5V. Complement signal selectable by PWB jumper.

Time End of delay period in Int Strobe mode; prompt with Strobe input in Ext Strobe mode.

Front-panel BNC connector provides unipolar pulse.

Rear-panel BNC connector provides NIM-standard slow positive logic level signal.

Time and Width from accepted Start input to end of reset.

Impedance Z$_0$<10Ω. Rise Time $\leq$50ns. Fall Time $\leq$50ns.

Amplitude 0V to +10V proportional to Start/Stop input time difference.

Valid CONV

Impedance Z$_0$<10Ω.Rise Time $\leq$50ns. Fall Time $\leq$50ns

Rear-panel connector provides NIM-standard slow positive logic level signal to indicate a Valid Conversion.

Amplitude Nominally +5V. Complement signal selectable by PWB jumper.

Time and Width from end of internal delay after Stop to end of reset.

Controls(Front Panel)

Range

Three-position rotary switch selects full scale time interval of 50, 100, or 200ns between accepted Start and Stop input signals.

Multiplier

Five-position rotary switch extends time range by a multiplying factor of 1, 10, 100, 1K, or 10K.

Delay

20-turn screw driver-adjustable potentiometer varies the delay of the TAC and SCA outputs from 0.5μs to 10.5μs, relative to an accepted Stop input signal; operable in the Int Strobe mode only.

Strobe Mode

Two-position locking toggle switch selects either Internal or External source for initiating the strobe cycle to strobe valid information from the TAC and SCA outputs. Start Gate Mode: Two-position locking toggle switch selects Coincidence or Anticoincidence mode of operation for the Start circuitry. Start circuitry is enabled in the Conic position or inhibited in the Anti position during the interval of a Start Gate input signal.

Stop Gate Mode

Two-position locking toggle switch selects Coincidence or Anticoincidence mode of operation for the Stop circuitry. Stop circuitry is enabled in the Conic position or inhibited in the Anti position during the interval of a Stop Gate input signal.

SCA Window (ΔT)

10-turn precision locking potentiometer sets the SCA upper-level discriminator threshold from 0.05 V to 10.05 V above the Lower Level (T) setting.

SCA Lower Level (T)

10-turn precision locking potentiometer sets the SCA lower level discriminator threshold from 0.05 V to 10.05 V.

TAC Inhibit

Two-position locking toggle switch. In the Inhibit position, the TAC output is available only if the output amplitude is within the SCA window. In the Out position, the SCA has no effect on the TAC output.

Controls (Rear Panel)

Gate Mode

Two-position locking toggle switch selects Coincidence or Anticoincidence mode of operation for the Start circuitry. Start circuitry is enabled in the COINC position or inhibited in the ANTI position during the interval of a Gate input signal.

Log CURR

Two-position locking toggle switch selects the use of ±6 V or ±12 V bin lines to provide current for the internal logic circuitry. In the ±6 V position, the Model 2038 is within the current allotment for a single NIM width when using a NIM Standard Class V power supply. In the ±12 V position, the Model 2038 exceeds the current allotment for a single NIM width on the +12 V and −12 V bin lines. However, this position allows the Model 2038 to be used with power supplies not providing +6 V and −6 V.

Performance

Time Resolution-FWHM

≤0.01% of full scale plus 5ps for all ranges Temperature

Instability

≤ ±0.01%/°C (±100 ppm/°C) of full scale or ±10 ps/°C (whichever is greater), 0 to 50°C Differential Nonlinearity: Typically, <1% from 10 ns or 2% of full scale (whichever is greater) to 100% of full scale Integral Nonlinearity: ≤±0.1% from 10 ns or 2% of full scale (whichever is greater) to 100% of full scale

Reset Cycle

Fixed 1.0μs for X1 and X10 Multipliers, fixed 5μs for X100 Multiplier, and fixed 50μs for x1K, and x10K Multipliers Occurs after Over Range, Strobe cycle, or EXT Strobe Reset cycle

Start-to-Stop Conversion Time

Minimum ≤ 10ns

Input Count

Rate >30 MHz

Application

- high energy physics experiments
- Basic counter
- Measuring a time interval
- Statistical counter
- The coincidence techniques and absolute activity measurement
- Gamma − Gamma coincidence
- Nuclear lifetimes and the coincidence method

Electrical and Mechanical

Power required	
+24V : 35 mA, -24V: 50 mA, +12V: 210 mA, 12V: 405 mA	
Physical	
weight	1120 g
Dimensions	220 x 34 x 248(mm)
Storage temperature	0°C to 50°C
Operating temperature	0°C to 40°C

Software

The device doesn't have any software

Ordering info

Standard package includes

Part #	Image	Description
TAC2038		Gate & Delay Generator
ACCE2038001		CD User guide (1 Pack)
ACCE2038002		box with foam insert
ACCE2038003		Guarantee (one year)

Optional accessories and services

Part #	Image	Description
ACCE2038004		Installation
ACCE2038005		Training
ACCE2038006		Re-calibration services
ACCE2038010		RG58A/U , 50 Ω cable with two BNC male plugs
ACCE2038011		BNC Terminator 50 Ω

ACCE2038012		CONN HOUSING plug 50POS AMP CONNECTORS
ACCE2038013		CONN PIN HOOD INT 50POS PANEL MT
ACCE2038014		GUIDE PIN 4-40
ACCE2038015		TE CONNECTIVITY AMP CONNECTORS MULTIMATE, TYPE II SERIES PIN
ACCE2038016		Bin guide pin
ACCE2038017		Guide socket