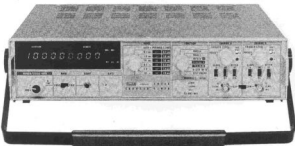


Universal Counter/Timer

1953A

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(NSN 9625-01-046-4912) 1953A

1953A Universal Counter/Timer

- Frequency, frequency ratio, period, period averaging, time interval, gated totalize measurements
- 9 digit display
- Trigger level controllable on both channels
- Selectable + or — slope triggering, ac or dc coupling, X1 or X10 attenuation
- Switch selection of separate or common input between channels

The 1953A is Fluke's sophisticated system counter which has an outstanding price-performance ratio and a wide array of options which allow you to select just the capability you need to solve your specific measurement problems.

Features

The standard instrument features all the basic functions required for a variety of measurements: frequency, frequency ratio, period, period averaging, time interval, and gated totalize. Wide-ranging provides six choices of gate times, period averages, and time interval resolutions. The 1953A counts to 125 MHz, higher with Option -07, -13, or -14.

The trigger-level controls for channels A and B allow the user to select a preset trigger level (DV dc) or to vary the level at which the input signal will trigger the counter. Two LED trigger status indicators operate in conjunction with each level control to show whether the counter is correctly triggered or when the input is more positive or negative with respect to the selected trigger level (see diagram). Two output jacks allow a DMM to be used to set the levels accurately.

Three signal conditioning switches are provided for each channel permitting the operator to select positive or negative slope triggering, ac or dc coupling, and X1 or X10 attenuation.

Dual input channels are direct coupled with 30 mV sensitivity. A switch for selection of separate or common input between channels is provided to allow input of either a single source common to both channels or two separate sources each on a separate channel. This is particularly useful in

time interval measurements. A TTL marker pulse output permits accurate determination of the start and stop signal trigger points. By connecting this marker pulse to an oscilloscope Z-axis input, the portion of the waveform displayed on the oscilloscope during the time interval measured will be intensity modulated.

A display check lights all digit segments when the reset button is pressed with the counter in self-check mode. A large, easy-to-read 9-digit LED display includes full leading zero suppression, automatic annunciation, and overflow.

Options

Three 500 input prescalers are available to extend frequency measurement capability from 0 to 125 MHz (standard) to 520, 1000 or 1250 MHz. A superior TCXO and two oven stabilized timebases provide higher accuracy measurements. Available to systems oriented users is a choice of three remote programming options, two of the fast parallel controlled type and one using the bi-directional IEEE-488 interface. A separate parallel data output option is available for digit, decimal point, overflow, and units annunciation information for data acquisition use. All options are TTL compatible.

IEEE-488 Interface Option

This interface permits interconnection with bus-compatible Fluke instruments and those of other manufacturers having the standard interface. The Fluke IEEE Interface Option (-15) is intended for systems applications where bus management and data manipulation are performed via a system controller (terminal, calculator, computer, etc.). The counter can also be manually operated without the use of a controller, displaying measurement information locally and outputting data (talk only mode) directly to a printer, display terminal or other peripheral device.

The 1953A Option -15 is compatible with the IEEE-488 interface standard using the preferred ASCII (U.S.A. Standard Code for information interchange) character-set, seven bit code set, interface driver and receiver circuits are all TTL compatible which permits remote operation of the counter's function, range, and signal conditioning, with front panel lockout.

Output information is comprised of 9 display digits, decimal point, and exponent for frequency or time units. Overflow indication is provided beyond a display of 10⁹.

Two internal D/A converters are included for remote programming of the A and B channel trigger levels. Each provides 1% resolution.

Specifications

Frequency Measurements

Range: 0 to 125 MHz (dc coupled); 5 Hz to 125 MHz (ac coupled). Prescalers to 1250 MHz (Options -07, -13, -14). All prescalers have clean dropout to eliminate false readings.
Gate Time: 0.1 ms to 10s in 6 decade steps (prescaled input increases gate time by a factor of 4 or 8).
Resolution: 0.1 Hz at 10s gate time to 10 kHz at 0.1 ms gate time.
Accuracy: \pm Timebase accuracy ± 1 count.
Readout: kHz or MHz displayed with decimal point.

Period Measurements

Range: 0 to 25 MHz (dc coupled); 5 Hz to 25 MHz (ac coupled).
Periods Averaged: 1 period to 10⁴ periods in decade steps.
Clock Frequency: 10 MHz.
Resolution: 0.1 μ s at 1 period to 1 ps at 10⁴ periods.
Accuracy: Timebase accuracy ± 1 count + trigger error of signal on input A*.
Readout: ms or μ s automatically displayed with decimal point.
 *See Timebase Characteristics chart.

Time Interval Measurements

Range: 0.1 μ s to 10⁵s.
Input: Channels A and B; common or separate.
Resolution: 10 ns to 0.1 μ s in 6 decade steps.
Accuracy: ± 1 count + timebase accuracy + trigger error*.
Readout: ms or μ s automatically displayed with decimal point.
 *See Timebase Characteristics Chart.

Totalize Measurements

Totalizing: A gated by B.
Range: 0 to 125 MHz (dc coupled); 5 Hz to 125 MHz (ac coupled).
Readout: Counts without annunciation or decimal point.

Ratio Measurements

Display: 11/12, where 11 and 12 are applied at input channels A and B respectively.
Range:
 11: 0 to 125 MHz (dc coupled); 5 Hz to 125 MHz (ac coupled).
 12: 0 to 25 MHz (dc coupled); 5 Hz to 25 MHz (ac coupled).
Accuracy: ± 1 count of signal on input A + trigger error of signal on input B*.
Readout: Decimal point without unit annunciation.
 *See Timebase Characteristics chart.

Sensitivity

Channel A: 30 mV rms sine wave from dc to 75 MHz increasing to 50 mV at 125 MHz; 100 mV pulse amplitude with minimum pulse width of 10 ns.
Channel B: 30 mV rms sine wave from dc to 25 MHz; 100 mV with minimum pulse width of 50 ns.
Channel C: See Option -07, -13, -14.

Input Impedance

Channel A or B: 1 M Ω , ≤ 30 pF
Channel C: 50 Ω nominal

Attenuator and Limiting

Channel A and B only. Sensitivity is decreased by a factor of approximately 10 in the X10 position.
Dynamic Range w/o Limiting: -3.5 to +3.5V (Channel A and B) 1V rms (Channel C).
Impedance in Limiting Condition: 120 k Ω in parallel with 75 pF (Channel A and B), 50VSWR less than 3:1 (Channel C).

Slope & Trigger Level

Channel A and B only. Front panel slide switch selects positive or negative slope triggering. Front panel control has ± 1 V range when attenuator is in X1 position, and ± 10 V in the X10 position.
Maximum Input Voltage: Channel A & B — 250V max dc + ac peak; 150V rms to 1 kHz; 5V rms to 125 MHz; Channel C — 5V rms, fuse protected.
Trigger Level Output: Channel A & B trigger levels available at rear panel BNC connectors.

Timebases

	Standard	-04 Option	-10 Option	-20 Option
Frequency	10.30 MHz	10.00 MHz	10.00 MHz	10.30 MHz
Aging Rate (Constant Temperature)	$\pm 3 \times 10^{-11}/\text{mo}$ 1 ppm/yr	$\pm 3 \times 10^{-11}/\text{mo}$ 1 ppm/yr	$\pm 1 \times 10^{-11}/\text{mo}$	$\pm 1.5 \times 10^{-11}/\text{mo}$
Temperature Accuracy (0°C-50°C)	$\pm 2 \times 10^{-4}$	$\pm 5 \times 10^{-4}$	$\pm 1 \times 10^{-4}$	$< 2 \times 10^{-4}$
Line Voltage ($\pm 10\%$)	$\pm 2 \times 10^{-4}$	$\pm 2 \times 10^{-4}$	$\pm 3 \times 10^{-4}$	$\pm 1 \times 10^{-4}$

* Trigger error of channels A or B is less than $\pm 0.3\%$ of one period — periods averaged for signals with better than 40-dB signal-to-noise ratio and 100 mV rms amplitude.

** Trigger error in time interval mode is less than ± 0.0025 / signal slope (V/in) in μ s.
 † Peak to peak variation.

External Timebase Input

Frequency Required: 10 MHz
Sensitivity: 250 mV
Impedance: 1 k Ω , 20 pF
Dynamic Range w/o Limiting: 8V peak to peak
Input Impedance During Limiting: 470 Ω in parallel with 30 pF

Option Specifications

Timebase Multiplier [-05]

Allows use of external 1, 5, or 10 MHz reference clock (standard unit accepts 10 MHz). This option also permits burst measurements to be made when a "level" signal is available if burst is longer than 100 μ s.

Superior TC40 [-04]

See timebase specifications above.

Over-Stabilized Timebase [-10]

Over is activated whenever instrument is connected to the AC line. See timebase specifications above.

Superior Over-Stabilized Timebase [-20]

Over is activated whenever instrument is connected to the AC line. See timebase specifications above.

IEEE-488 Interface [-15]

Full remote programming of function, range, and all signal conditioning controls including trigger levels. Directly compatible with IEEE-488-1978 Interface Standard. Data output includes 9 digits of display information, decimal point, and exponent for time or frequency units. Front panel lockout is provided. Ask for application bulletin 23.
Separators: SM1, AM1, TS, L4, SR1, RL2.

Signal Output Unit [-02]

Provides BCD TTL outputs from each digit, plus overflow, units annunciation, decimal point, and print command.

Basis Parallel Remote Programming [-11]

Allows single-line programming (TTL or contact closure) of range, mode, slope, and reset functions. Allows analog programming of trigger levels, and provides power sense, overflow status, and system ready outputs. Front panel lockout is provided.