WE7521
4-CH Timing Measurement Module

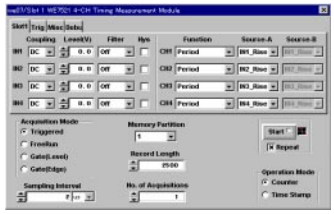
Overview

The WE7521 is a 4-channel counter module.

It can measure one of five parameters (period, time interval, totalize count, up and down count,and frequency ratio) of four input signals.

The measured values are written to the acquisition memory every specified sampling interval.

In addition, the WE7521 includes a "time stamp mode" in which the time is recorded when any of the four input signals change.



WE7521

Features

- Arbitrarily combine 4 channels of input, and perform measurement on one of five parameters (period, time interval, totalize count, up and down count, and frequency ratio)
- Store up to 1 Mpoints of measured data continuously (up to 4 Mpoints in time stamp mode)
- 5 ns time resolution, maximum sampling frequency of 500 kSps (in counter mode)

Performance Specifications

Number of Inputs: 4
Input Format: Non-isolated, unbalanced
Connector Type: BNC
Input Coupling: DC/AC
–3 dB Point During AC Coupling: 10 Hz (Typical value (see Note 1))
Input Threshold Level: Set in the range ±20 V (0.1 V resolution) for each input
Threshold Level Accuracy: ±(5% of the specified value + 150 mV)
Input Impedance: 1 MΩ ±1%
Input Filter: OFF/100kHz/10kHz/1kHz (–3 dB point) (Typical value (see Note 1))
Input Sensitivity: When hysteresis width is NORMAL and frequency is 1 MHz or less: 1.0 Vpp (Typical value (see Note 1))
When hysteresis width is WIDE and frequency is 1 MHz or less: 3.0 Vpp (Typical value (see Note 1))
Hysteresis Width: NORMAL/WIDE
Hysteresis Direction: Center/Upper/Lower (common to all inputs)
Maximum Input Voltage: ±42.4 V (DC + ACpeak) (Overvoltage Category CAT I and II)

Specifications for the Counter Mode

Number of Counters: 4
Measurement Slope: Rising edge or falling edge
Measurement Function: Period, time interval, totalize count, up and down count, and frequency ratio
Display Resolution: During period/time interval measurement: 5 ns
Minimum Input Pulse Width: 50 ns
Minimum Input Edge Interval: For all input edges during up and down count: 50 ns
Data Width: During period/time interval measurement: 32 bits
During totalize count/up and down count/ frequency ratio measurement: 29 bits (see Note 2)
Acquisition Mode: Trigger, free run, gate (level), gate (edge)
Specifications for Each Measurement Function
a) Period
Measurement range: 100 ns to 20 s (see Note 3)
Resolution: $(5\text{ ns} \pm \sqrt{2} \times \text{trigger error})$
Accuracy: Resolution ± (time base aging 3 sampling interval) ±5 ns
b) Time interval
Measurement range: 100 ns to 20 s (see Note 3)
Resolution: (±5 ns ± input A trigger error ± input B trigger error)
Accuracy: Resolution ± (time base aging 3 sampling interval) ± trigger level timing error ±5 ns
c) Totalize count
Counting capacity: 0 to 536,870,911 (see Note 3)
Counting control: Through measurement start/stop or gate (pulse) using the input signal
Counting error: ±1 count (when the counter is controlled through measurement start/stop)

$$\pm 1\text{ count} \pm \frac{(\text{input B trigger error [rising]} \pm \text{input B trigger error [falling]})}{\text{input A period}}$$

(When controlled using gate/input A: signal to be measured, input B: gate signal)
d) Up and down count
Counting capacity: –268,435,456 to 268,435,455 (see Note 4)
Counting control: Through measurement start/stop or reset (Z phase) using the input signal
Counting error: ±1 count (when the counter is controlled through measurement start/stop)

$$\pm 1 \text{ count} \pm \frac{\text{input B trigger error} \times N}{\text{input A period}} \quad (N=1, 2, 4)$$

(When controlled using reset/input A: signal to be measured, input B: reset signal)

Multiplication: × 1, × 2, and × 4

e) Frequency ratio

Counting capacity: 0 to 536,870,911 when multiplying factor is 1, 0 to 33,554,431.9 when multiplying factor is 16, 0 to 4,194,303.99 when multiplying factor is 128, 0 to 524,287.999 when multiplying factor is 1024 (see Note 3)

Counting control: Measurement start/stop

$$\text{Counting error: } \pm 1 \text{ count} \pm \frac{\sqrt{2} \times \text{input B trigger error}}{\text{input A period} \times N} \quad (N=1, 16, 128, 1024)$$

Multiplication: 1, 16, 128, and 1024

Acquisition Memory

Maximum record length: 1 Mpoint/CH

Memory partition: 1, 2, 4, 8, 16,32, 64, 128, and 256 (only during trigger mode)

Sampling interval: 2µs to 10s

Sampling signal source: Internal time base, bus clock, and input signal

Trigger source: Input signal, measured value, bus trigger signal of the measuring station

Hold off: Record length to 1,048,576 points (trigger mode), 1 to 1,048,576 points (gate (edge) mode)

Data hold function: Hold previous value or Update on new value (see Note 5)

Specifications for the Time Stamp Mode

Number of Inputs: 4

Measurement Slope: Rising edge, falling edge, and both

Maximum Measurement Time: Approximately 360 hours (5 × 248 ns)

Display Resolution: 5 ns

Resolution: $(\pm 5 \text{ ns} \pm \sqrt{2} \times \text{trigger error})$

Accuracy: Resolution ± (time base aging × sampling interval) ±5 ns

Minimum Pulse Width: 200 ns

Data Format: 32 bits (24-bit time stamp data + 8-bit input edge data)

Acquisition Mode: Free run only (see Note 6)

Record Length: 4 Mpoints

Reference Time Axis Accuracy

Frequency Stability

Aging: $\pm 1.5 \times 10^{-6}$ /year

Temperature Characteristics

$\pm 2.0 \times 10^{-6}$ (5°C to 40°C)

Note 1: Typical value represents a typical or average value. It is not strictly guaranteed.

Note 2: The measured data length is 29 bits, but the data width is expanded to 32 bits.

Note 3: When the measurement range is exceeded, the data is set to invalid value.

Note 4: When the measurement range is exceeded, the data returns to the minimum (maximum) value of the counting capacity and continues the measurement.

Note 5: You can select a mode in which the previous value is held or a mode in which an invalid value is held when there is no input change during the sampling interval.

Note 6: If the rate of change of input is too fast and the data cannot be saved, the measurement is stopped.

General Specifications

Safety Standard: Complies with CSA C22.2 No. 1010.1 and EN61010-1, conforms to JIS C1010-1

Warm-Up Time: At least 30 minutes

Operating Conditions: Same as those of the measuring station

Storage Conditions

Temperature: –20°C to 60°C

Humidity: 20% to 80% RH (no condensation)

Power Consumption: 8 VA (typical value (see Note) at 100 V/50 Hz)

External dimensions: Approx. 33{1.3}(W) × 243{9.54}(H) × 232{9.13}(D) mm{inch} (projections excluded)

Weight: Approx. 0.7{1.54} kg{lb}

Number of Used Slots: 1

Standard Accessories: User's manual (this manual) (1)

Note Typical value represents a typical or average value. It is not strictly guaranteed.

AVAILABLE MODELS

Model	Description
707521/HE	4-CH Timing Measurement Module

Dimensions

Unit: mm(inch)