UZ 2400 Universal Counter

digimess® compact

Order No. H.UC 10-00

The UZ 2400 universal counter is a compact counter for up to 2.4 GHz. It features two counter channels (channel A: 10 Hz to 100 MHz and channel C: 50 MHz to 2400 MHz).

The measured values are displayed in a 16-character line on a large, backlit alphanumeric LCD.

A maximum of 8 places and one decimal point are used to display the measured values. The format depends on the measuring mode.

Full remote control (without trigger level at channel A) of the counter is possible via an RS-232 interface.

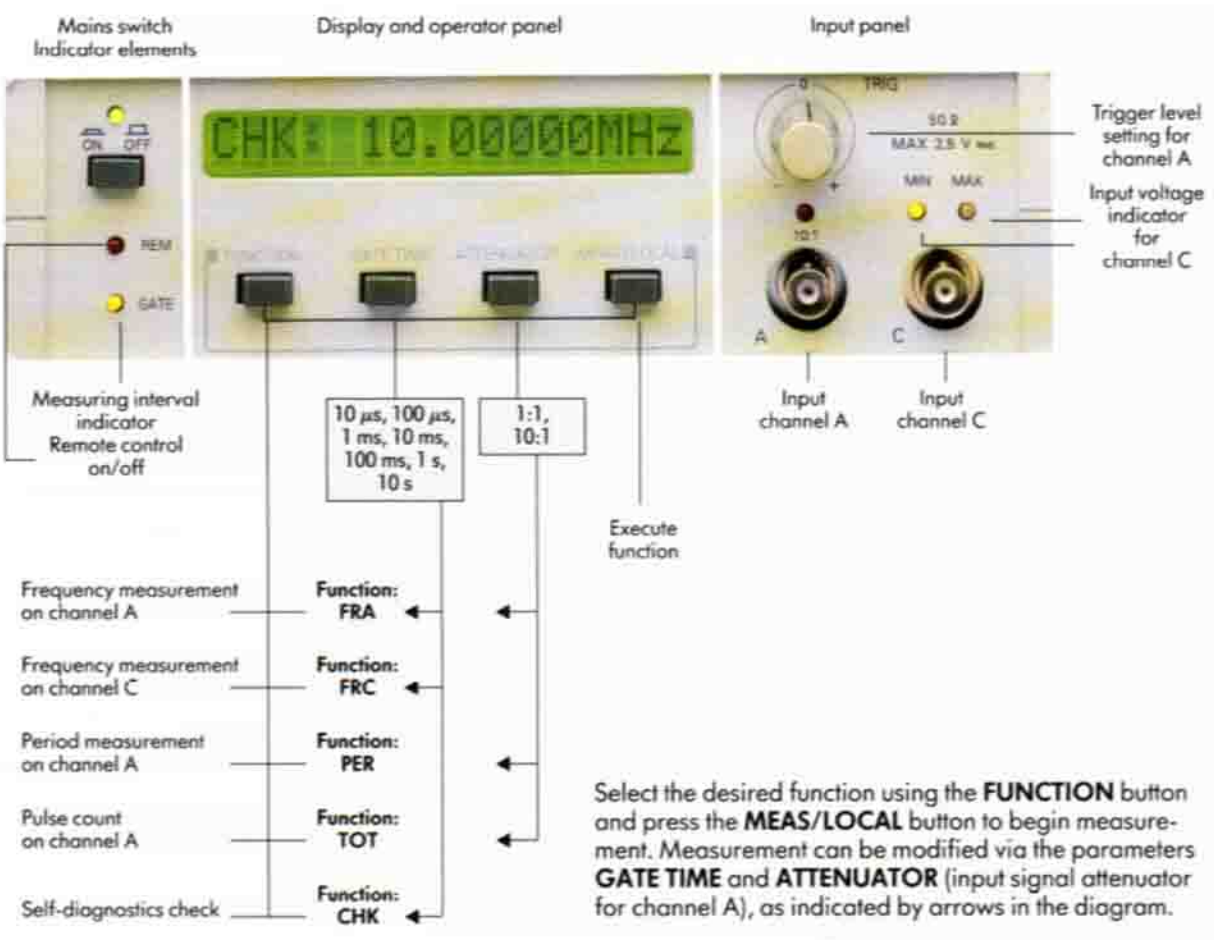
Special features of the UZ 2400 include a high basic accuracy of 10^{-10} (short-term) due to the quartz oven oscillator, and a longterm stability of 10^{-8} over 24 hours.

The built-in microprocessor carries out a self-diagnostics check and makes operation extremely simple.

The many outstanding features of the UZ 2400 allow it to set new standards in its class.

Measuring is easy with the UZ 2400!

Direct input mode



Select the desired function using the **FUNCTION** button and press the **MEAS/LOCAL** button to begin measurement. Measurement can be modified via the parameters **GATE TIME** and **ATTENUATOR** (input signal attenuator for channel A), as indicated by arrows in the diagram.

Remote control mode

Pressing the **MEAS/LOCAL** button in remote control mode returns you to direct entry mode.

Technical data

Characteristics of channel A	
Frequency range	10 Hz ... 100 MHz
Basic sensitivity (voltage divider 1:1)	V_{rms} = 25 mV – sine signal V_{pp} = 75 mV with pulses (minimum width 10 ns)
Input voltage	AC voltage
Input impedance	1 MΩ (< 20 pF)
Input divider	1:1 or 10:1
Dynamic range with divider 10:1	V_{pp} = 75 mV ... V_{pp} = 5 V V_{pp} = 750 mV ... V_{pp} = 50 V
Maximum input voltage	50 V ($V_{=}$ + V_{pp} with divider 10:1)
Range of trigger level adjustment Voltage divider 1:1 Voltage divider 10:1	Adjustable via potentiometer +0.5 V ... –0.5 V +5 V ... –5 V

Characteristics of channel C	
Frequency range	50 MHz ... 2400 MHz
Division ratio	100:1
Sensitivity	V_{rms} = 25 mV where f = 100 MHz ... 2 GHz V_{rms} = 50 mV where f = 50 MHz ... 100 MHz and where f = 2 GHz ... 2.4 GHz
Input impedance	50 Ω
Standing wave ratio	≤ 2.5
Input voltage	AC voltage
Maximum input voltage	V_{rms} = 2.5 V (sine signal) ± 40 V DC voltage content
Optimal input voltage	"MIN" and "MAX" LEDs are both off

Functions

Self-diagnostics check (CHK)	
Measuring frequency	10 MHz (internal)
Gate time	10 µs, 100 µs, 1 ms, 10 ms, 100 ms, 1 s, 10 s
Accuracy	± 1 LSD[1]
Display of result	MHz with decimal point

Frequency measurement on channel A (FRA)	
Measurement range	10 Hz ... 100 MHz
Gate time	t_{gate} = 10 µs, 100 µs, 1 ms, 10 ms, 100 ms, 1 s, 10 s
Frequency resolution	f = 1 / t_{gate} (max. 8 digits)
Accuracy	± 1 LSD[1] ± time base error
Results display	Hz, kHz, MHz with decimal point

Frequency measurement on channel C (FRC)	
Measurement range	50 MHz ... 2.4 GHz
Gate time	t_{gate} = 10 µs, 100 µs, 1 ms, 10 ms, 100 ms, 1 s, 10 s
Input voltage	25 mV ≤ V_{rms} ≤ 2.5 V
Frequency resolution	f = 100 / t_{gate} (max. 8 digits)
Accuracy	± 1 LSD[1] ± time base error
Results display	MHz, GHz with decimal point

Period measurement on channel A (PER)	
Measurement range	100 µs ... 100 ms
Sensitivity	V_{rms} = 100 mV
Resolution	100 ns
Accuracy	± 1 LSD[1] ± time base error ± trigger error[2]
Results display	µs, ms, s with decimal point

Pulse count on channel A (TOT)	
Measurement range	1 ... 10^9 events
Frequency range	0 ... 100 MHz
Accuracy	± 1 LSD[1]
Results display	without unit of measurement and decimal point

Time base	
Warm-up time	15 min.
Nominal frequency of crystal	10 MHz
Accuracy of frequency setting	$\pm 5 \cdot 10^{-9}$
Short-term stability	$1 \cdot 10^{-10}$/s
Frequency deviation after 24 hours	$\leq \pm 10^{-8}$
Temperature effect	$< 5 \cdot 10^{-9}$/°C

Display: 16-digit alphanumeric LCD-matrix, backlit

RS-232 C interface
Full remote control (without trigger level at channel A) of the counter is possible via the integrated RS 232 C serial interface.
Possible baud rates: 1200 baud, 2400 baud, 4800 baud, 9600 baud

Environmental conditions	
Nominal temperature	+23 °C ± 2 °C
Operating temperature	+5 °C ... +40 °C
Relative atmospheric humidity	20% ... 80%
Atmospheric pressure	86000 .... 106000 Pa
Interference suppression	in accordance with Vfg. 1046/1984, VDE 0871 Category B
Dimensions (W × H × D)	225 mm × 85 mm × 200 mm
Dimensions (W × H × D) incl. packaging	310 mm × 110 mm × 265 mm
Weight	approx. 1.8 kg
Weight incl. accessories and packing	approx. 2.6 kg

Power supply	
Operating voltage	220 V/110 V ± 10% (internally switchable) 50 Hz ... 60 Hz ± 5%
Power consumption	20 VA
Fuses	Mains fuse T 100 mA/250 V (220 V), T 200 mA 250 V (110 V)
Protection class	Protection class I in accordance with IEC 348 ≙ DIN VDE 0411 Part 1 E 81

Accessories included in packing:

– Mains cable
– BNC-BNC-cable
– Operating instructions
– Replacement fuse 100 mAT

Note:
The adjustment of the gate time has no effect on the functions period measurement and pulse count. The repetition rate of the measurement during automatic operation is approx. 200 ms.

1) LSD: the last significant digit is the smallest possible value to be displayed and corresponds to the resolution of the current measurement range.

2) The trigger error (RMS value) is computed as follows:

$$\Delta Ts = \sqrt{\frac{\left(V_{noise}^2 + V_{in\text{-}noise}^2\right)}{S}}$$

V_{noise} = noise voltage in signal
$V_{in\text{-}noise}$ = internal noise voltage in amplifier
S (V/s) = pulserate-off-rise of the measured signal content at the trigger point