

## UCA-6200 Frequenzzähler / Universalzähler



### 400 MHz / 6 GHz

- Measuring frequency over 400MHz within standard 6GHz Channel 3.
- 12 digits resolution with 1s gate time.
- 40ps time domain function resolution.
- Great Features for Universal Purposes.
- Full Math Functions & Easy Operation Panel.
- Fast Measurement & Special Application
- Free Software & Familiar SCPI Commands.

### 12 Digits Resolution & 6 GHz Frequency Measurement



Figure-1

The UCA-6200 universal counter, whose production procedures conform to ISO 9004, has frequency resolution of 12 digits per second (Figure-1), 40 ps time interval resolution and a complete set of test and analysis features. The standard UCA-6200 CH3 comes with the range from 375 MHz to 6GHz and the standard CH 1 & 2 from 1 mHz to 400 MHz.

### Great Features for Universal Purposes

The UCA-6200 also provides great features including Frequency & Ratio (11 Digits/Sec.), Time interval, Period (2.5 ns to 1000s), Duty Cycle, Pulse Width, Rise/Fall Time, Peak Volts (100 Hz~300 MHz), Phase, Totalize, Temperature

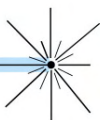


Figure-2



Figure-3

Stability (< 1 PPM), Aging Rate (< 2 PPM per year), timebase reference channel (Figure-2) and complete Front-End Isolation. Moreover, it offers 20 memories (Figure-3) for storing frequently-used operations.



## Full Math Functions & Easy Operation Panel

The UCA-6200 offers built-in statistics and math functions. Users can do measurements, simultaneously measure, count in mean, min/max, delta & standard deviation (Figure-4). And scale & offset can be easily used for compensation purpose according to users' Applications. In addition, to reach these measurements, user can easily use the numeric buttons to define settings. Moreover, the UCA-6200 also provides users the visible light buttons as functions are working (Figure-5).



Figure-4

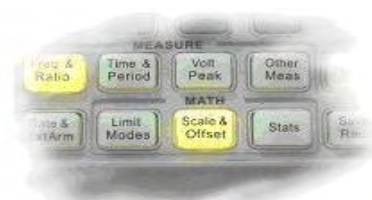


Figure-5

## Fast Measurement & Special Application

The UCA-6200 supports real-time digital signal processing technology, which is applied to analyze data as simultaneously getting new readings and speeding measurement. The  $\Omega$ Limit Modes $\Omega$  is worth to be mentioned, i.e. users can set margin according to their specific measurements, and via Go-On or Stop and USB Output settings (Figure-6), the UCA-6200 can be keep or stop measuring as a limit is exceeded, and generate an output signal to trigger external devices.

## Free Software & Familiar SCPI Commands

Users can get data logs (Figure9) by PC software (Microsoft Excel) via a USB, or an optional GPIB interface. Furthermore, UCA-6200 supports a web server function, so users can easily control it via a LAN interface (Figure 10) by inputting an Ethernet address (Default: 192.168.0.247) on web browsers. In addition, by the SCPI commands compatible to Agilent 53132A, the UCA-6200 can provide familiar syntax string for users' applications.

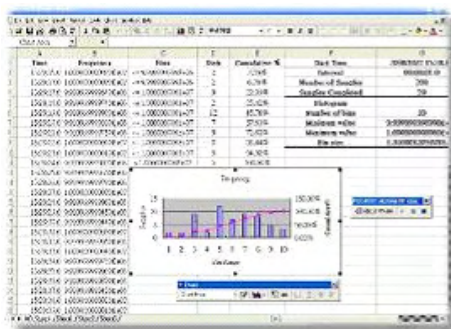


Figure-9

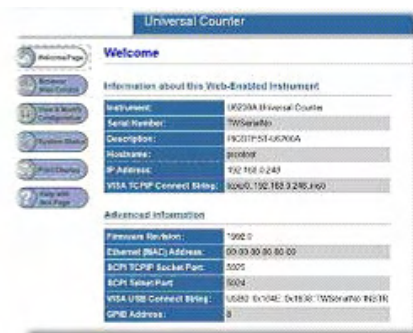


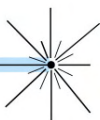
Figure-10

## Specification UCA6200

Channel 1 & 2 Input Specifications	
DC Coupled	1 mHz to 400 MHz
AC Coupled	200 kHz to 400 MHz (50 $\Omega$ )
	30 Hz to 400 MHz (1 M $\Omega$ )
FM Tolerance	FM Tolerance: 75%
Voltage Range and Sensitivity	
1 mHz to 225 MHz	20 mVrms to $\pm$ 5V ac + dc (Medium and High)
	25 mVrms to $\pm$ 5V ac + dc (Low)
225 MHz to 400 MHz	30 mVrms to $\pm$ 5V ac + dc
	(75 mVrms with optional rear connectors)
Channel 1 & 2 Input Characteristics 1	
Impedance	1 M $\Omega$ or 50 $\Omega$
(ATT X 1, 1 M $\Omega$ Capacitance)	24 pF
(ATT X 10, 1 M $\Omega$ Capacitance)	15 pF



Coupling	AC or DC	
Low-Pass Filter	100 kHz (or disabled)	
	-20 dB at > 1 MHz	
Input Sensitivity	Selectable between Low, Medium (default), or High	
	Medium is approximately 1.35x High sensitivity,	
	low is approximately 1.7x High Sensitivity	
<b>Voltage Range and Sensitivity (Single-Shot-Pulse)</b>		
1.5 ns to 10 ns Pulse Width	80 mVpp to 10Vpp	
	(150mVpp with optional rear connectors)	
> 10 ns Pulse Width	50 mVpp to 10Vpp	
	(150mVpp with optional rear connectors)	
<b>Trigger Level (ATT x 1)</b>		
Range	± 5.125 V	
Accuracy	± (15 mV + 1 % of trigger level)	
Resolution	2.5 mV	
ATT x 10 Range	X 10	
Trigger Slope	Positive or Negative	
Auto Trigger Level	Range	0 to 100 % in 1 % steps
	Frequency	Peak Voltage fast mode > 10 kHz
		Peak Voltage slow mode > 100 Hz
Amplitude > 100 mVpp (No amplitude modulation)		
<b>Damage Level</b>		
DC ~ 400 MHz 50Ω	12 Vrms	
0 to 3.5 kHz, 1 MΩ	350 Vdc + ac pk	
3.5 kHz to 100 kHz, 1 MΩ	350 Vdc + ac pk linearly derated to 12 Vrms	
100 kHz to 400 MHz, 1 MΩ	12 Vrms	
<b>Attenuator</b>		
Voltage Range	x 10	
Trigger Range	x 10	
1. Specifications and Characteristics for Channels 1 and 2 are identical for both Common and Separate Configurations.		
2. Values shown are for x 1 attenuator setting. Multiply all values by 10 (nominal) when using the x 10 attenuator setting. Note that it may necessary to recalibrate the input offset in the application environment (especially at high temperature) to achieve maximum sensitivity.		
<b>Channel 3 Input Specifications</b>		
Frequency Range	Standard	375 Mhz to 6 Ghz
<b>Channel 3 Input Characteristics</b>		
Impedance	50 Ω	
Coupling	AC	
VSWR	< 2.5:1	
<b>Power Range and Sensitivity (Sinusoid)</b>		
375 MHz to 500 MHz	-16 dBm to +15 dBm	
500 MHz to 1 GHz	-20 dBm to +15 dBm	
1 GHz to 2 GHz	-23 dBm to +15 dBm	
2 GHz to 4 GHz	-25 dBm to +15 dBm	
4 GHz to 5 GHz	-21 dBm to +15 dBm	
5 GHz to 5.5 GHz	-20 dBm to +15 dBm	
5.5 GHz to 6 GHz	-17 dBm to +15 dBm	
<b>Damage Level</b>		
+ 25dBm, ± DC 12 V		
<b>External Arm Input Specifications</b>		
Signal Input Range	LVTTTL and TTL compatible	
Timing Restrictions		
Pulse Width	> 50 ns	
Transition Time	< 250 ns	
Start-to-Stop Time	> 50 ns	
Damage Level	12 Vrms	
<b>External Arm Input Characteristics</b>		
Impedance	1 kΩ	
Input Capacitance	17 pF	
Start Slope	Positive or Negative	
Stop Slope	Positive or Negative	
Notes	1. External Arm is available for all measurements except Peak Volts.	
	2. External Arm is referred to as External Gate for some measurements.	



Internal Time Base Stability			
		Standard (0°C to 50°C)	High Stability Oven (UCS6200-opt.01)
Temperature Stability		± 1 x 10E-6	± 1 x 10E-9
Aging Rate	Per Day		± 8 x 10E-10
	Per Month		
	Per Year	± 2 x 10E-6	± 8 x 10E-8
Turn-on stability vs. Time (30 min)			± 2.0 x 10E-8 (referenced to 24 hours)
Calibration		Electronic	Electronic
External Time Base Input Specifications			
Voltage Range	200 mVrms to 10 Vrms		
Damage Level	12 Vrms		
External Time Base Input Characteristics			
Threshold	0 V		
Impedance	1 kΩ		
Input Capacitance	25 pF		
Input Frequency	10 MHz		
Internal vs. External Time Base Selection	Manual	Select Internal or External	
	Automatic	Internal used when External not present (default)	
Time Base Output Specifications			
Output Frequency	10 MHz		
Voltage	> 1 Vpp into 50 Ω (centered around 0 V)		
Measurement Specifications			
<b>Frequency, Period Channel 1 and 2</b>	1 mHz to 400 MHz (2.5 ns to 10 s)		
Trigger	Default setting is Auto Trigger at 50 %		
"Auto" Gate Time	0.1 sec		
STD CH 3	375 MHz to 6 GHz (0.166 ns to 2.6 ns)		
<b>Frequency Ratio</b>	CH1/ CH2, CH1/CH3, CH2/CH1, CH3/CH1 (Measurement is specified over the full signal range of each input)		
Results Range	10E-10 to 10E+11		
"Auto" Gate Time	0.1 sec		
<b>Time Intervall</b>	Measurement is specified over the full signal ranges of channels 1 and 2. The width of the pulse must be greater than 1 ns, frequency range to 300 MHz.		
Trigger	Default setting is Auto Trigger at 50 %		
Results Range	-0.5 ns to 10E+5s		
Resolution	40 ps		
RMS Resolution	120 ps		
Systematic Uncertainty	± (TI x Time Base Error) ± Trigger Level Timing Error ± 500 ps Differential Channel Error		
<b>Pulse Width Time</b>	Measurement is specified over the full signal range of channels 1. The width of the pulse must be greater than 1 ns, frequency range to 300 MHz.		
Pulse Selection	Positive or Negative		
Trigger	Default setting is Auto Trigger at 50 %		
Results Range	1.5 ns to 10E+5s		
Resolution	40 ps		
RMS Resolution	120 ps		
Systematic Uncertainty	± (TI x Time Base Error) ± Trigger Level Timing Error ± 500 ps Differential Channel Error		
<b>Rise/Fall Time</b>	Measurement is specified over the full signal range of channels 1. The width of the pulse must be greater than 1 ns, frequency range to 300 MHz.		
Edge Selection	Positive or Negative		
Trigger	Default setting is Auto Trigger at 10 % and 90 %		
Results Range	2 ns to 10E+5s		
Resolution	40 ps		
RMS Resolution	120 ps		
Systematic Uncertainty	± (TI x Time Base Error) ± Trigger Level Timing Error ± 500 ps Differential Channel Error		
<b>Phase</b>	Measurement is specified over the full signal range of channels 1. The width of the pulse must be greater than 1 ns, frequency range to 300 MHz.		
Results Range	- 180° to + 360°		
Resolution	40 ps		
RMS Resolution	120 ps		
Systematic Uncertainty	± (Trigger Level Timing Error) x Frequency		
<b>Duty Cycle</b>	Measurement is specified over the full signal range of channels 1. The width of the pulse must be greater than 1 ns, frequency range to 300 MHz.		



Pulse Selection	Positive or Negative		
Trigger	Default setting is Auto Trigger at 50 %		
Results Range	0 to 1		
Resolution	40 ps		
RMS Resolution	120 ps		
Systematic Uncertainty	± Trigger Level Timing Error ± 500 ps Differential Channel Error		
<b>Totalize</b>	Measurement is specified over the full signal range of channels 1. The width of the pulse must be greater than 1 ns, frequency range to 400 MHz.		
Pulse Selection	Positive or Negative		
Trigger	Default setting is Trigger at 0 V		
Results Range	1.5 ns to 10E+15		
Resolution	1 count		
Systematic Uncertainty	± 1 count		
<b>Peak Volts</b>	Results Range	- 5.1 V to + 5.1V	
	Resolution	2.5 mV	
DC Signals		15 mV + 2 % of V	peak-to-peak amplitude greater than 200 mV
DC Signals (ATT x 10)		150 mV + 2 % of V	peak-to-peak amplitude greater than 1 V
1 Vp-p, 50Ω, ATT OFF	100 Hz ~ 10 kHz	15 mV + 2 % of V	peak-to-peak amplitude greater than 200 mV
	10 kHz ~ 5 MHz	15 mV + 4 % of V	
	5 MHz ~ 80 MHz	15 mV + 7 % of V	
	80 MHz ~ 300 MHz	15 mV + 15 % of V	
The peak volts measurement will keep operating up to 400 MHz, although results act as referency only. Tres is the resolution including effect of certain internal errors.			
The differential cannel Error terms which counted ba many systematic uncertainty equations result channel-to-channel dissaccord and internal noise. These issues can be improved by the TI calibration in the well-controlled temperature enviroment.			
<b>General Specifications</b>			
Item	Limitation & Description		
Power Supply Voltage	100 V / 240 V ± 10 % 50 Hz ~ 60 Hz ± 10 % 100 V / 120 V ± 10 % 400 Hz ± 10 %		
Power Requirements	50 VA Maximum		
Operating Humidity	Maximum relative humidity 80 % for temperature up to 31 °C decreasing linearly to 50 % relative humidity at 40 °C		
Operatin Environment	0 to 55 °C		
Storage Temperature	- 40 °C to + 70 °C		
Operating Altitude	Up to 2000 m		
Bench Dimensions (WxHxD)	210 mm x 85 mm x 350 mm		
Weight	3.2 kg		
Safety	IEC61010-1:2001/EN61010-1:2001(2nd Edition)		
EMC	EN61326, IEC61000-3, IEC61000-4		
Warm-up Time	1 Hour		
Warranty	1 Year		
Accessory	1. UCA6200-opt 01: High Stability Oven 2. UCA6200-opt 04: Rear panel input module (CH1/CH2) 3. UCA6200-opt 05: Rear panel input module (CH1/CH2/CH3) 4. M3500-opt 04: GPIB Card		

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