

Product Information - Picotest U6200A Universal Counter

The Picotest U6200A offers a higher frequency capability, better oscillator temperature stability, higher voltage measurement bandwidth, higher resolution and many other benefits compared with the competition. The U6200A CH3 is included free and has a range from 375 MHz to 6GHz. An optional 20GHz module is also available. The rear inputs are not connected to the front panel inputs, allowing up to 5 measurement channels. Other benefits compared with the competition include faster measurements, faster statistics, USB and LAN inputs, better damage protection levels and electronic calibration. Like all Picotest products, it's backed by our 3 yr warranty and 30 day refund policy

- 12 Digit Resolution
- Easy to use keypad
- 1mHz – 400MHz Ch1 and CH2
- 375MHz to 6GHz on CH 3 included FREE
- 10MHz synchronization included FREE
- Optional rear Inputs are isolated from the front panel allowing 4+1 measurement channels
- 40ps time domain function resolution.
- Time Base Stability: < 1 PPM temperature and <2PPM per year
- Optional Oven Stability <5PPB temperature and <80PPB per year
- Electronic Calibration
- Statistics & Math Functions
- 20GHz module option available
- SCPI commands are compatible with the Agilent 53132A

Detailed Specifications - Picotest U6200A Universal Counter

12 Digits Resolution & 6 GHz Frequency Measurement

The Picotest U6200A universal counter, whose production procedures conform to ISO 9004, has a frequency resolution of 12 digits per second, 40 ps time interval resolution and a complete set of test and analysis features. The standard U6200A's CH3 has a range from 375 MHz to 6GHz and the standard CH 1 & 2 has a range from 1 mHz to 400 MHz.

Great Features for Universal Purposes

The Picotest U6200A also provides great features including Frequency & Ratio (11Digits/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 Stability (< 1 PPM), Aging Rate (< 2 PPM per year), timebase reference channel and complete Front-End Isolation. Moreover, it offers 20 memory locations for storing frequently-used operations.

Full Math Functions & Easy Operation Panel

The Picotest U6200A offers built-in statistics and math functions. Users can make measurements, simultaneously measure and report mean, min/max, delta and standard deviation. Scale & offset can be easily used for compensation purpose according to the users' applications. In addition, in order to obtain these measurements, the user can easily use the numeric buttons to define settings. The U6200 also provides users with visual indications of selected functions.

Fast Measurement & Special Application

The U6200A supports real-time digital signal processing technology, which can be applied to analyze data while simultaneously obtaining new readings and speeding measurement. The "Limit Modes" feature is worth to be mentioning since users can set margin according to their specific measurements, and via Go-On or Stop and USB Output settings, the U6200A can continue or stop measuring as a limit is exceeded, and generate an output signal to trigger external devices.

Free Software & Familiar SCPI Commands

Users can obtain data logs via PC software (Microsoft Excel®) using a USB, or an optional GPIB interface. Furthermore, U6200A also supports a webserver function, so users can easily control it via a LAN interface (Figure 10) by entering an Ethernet address (Default: 192.168.0.247) on web browsers. In addition, through the SCPI commands compatible with Agilent 53132A, the Picotest U6200A can utilize familiar syntax string for users' applications. For more command information, please refer to the U6200A User's Manual in Chapter 7.

Accessories

1. High stability oven oscillator module : U6200-OPT01
2. 250MHz-20GHz RF module : U6200-OPT02
3. Rear Input (CH1/2) module : U6200-OPT04
4. Rear panel input module -- CH1/2/3 : U6200-OPT05

Specification List

Channel 1 & 2 Input Specifications		
DC Coupled	1mHz to 400 MHz	
AC Coupled	200KHz to 400 MHz (50 Ω) 30 Hz to 400 MHz (1 M Ω)	
FM Tolerance	FM Tolerance: 25%	
Voltage Range and Sensitivity		
1mH to 225 MHz	20 mVrms to ± 5 V ac + dc (Medium and High) 25 mVrms to ± 5 V ac + dc (Low) (75 mVrms with optional rear connectors)	
225 MHz to 400 MHz	30 mVrms to ± 5 V ac + dc (75 mVrms with optional rear connectors)	
Channel 1 & 2 Input Characteristics		
Impedance	1 M Ω or 50 Ω	
(ATT X 1, 1 MΩ Capacitance)	24 pF	
(ATT X 10, 1 MΩ 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	
Internal Noise	200uVrms(typical)	
Voltage Range and Sensitivity (Single-Shot Pulse)		
1.5ns to 10ns Pulse Width	80 mVpp to 10 Vpp (150 mVpp with optional rear connectors)	
>10 ns Pulse Width	50 mVpp to 10 Vpp (150 mVpp with optional rear connectors)	
Trigger Level(ATT x 1)		
Range	± 5.125 V	
Accuracy	$\pm(15$ mV + 1% of trigger level)	
Resolution	2.5mV	
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)

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.

Damage Level	
DC~400MHz 50 Ω	12 Vrms
0 to 3.5 kHz, 1 MΩ	350 V dc + ac pk
3.5 kHz to 100KHz, 1 MΩ	350 V dc + ac pk linearly derated to 12 Vrms
100KHz to 400MHz, 1 MΩ	12 Vrms
Attenuator	
Voltage Range	x10
Trigger Range	x10
Channel 3 Input Specifications	
Frequency Range	375 MHz to 6 GHz
Channel 3 Input Characteristics	
Impedance	50 Ω
Coupling	AC
VSWR	< 2.5:1
Power Range and Sensitivity (Sinusoid)	
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	-21dBm 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
Damage Level	
+25 dBm, DC ±12V	
Option Channel 3 Input Specifications (U6200-opt02)	
Frequency Range	250 MHz to 20 GHz
Option Channel 3 Input Characteristics (U6200-opt02)	
Impedance	50 Ω
Coupling	AC
VSWR	< 2.5:1
Power Range and Sensitivity (Sinusoid, at 25°C)	
250-500MHz	-22~+23dBm
0.5-14GHz	-27~+23dBm
14-15GHz	-21~+23dBm
15-16GHz	-19~+23dBm
16-19GHz	-17~+23dBm
19-20GHz	-13~+23dBm
Damage Level	
+26 dBm, DC ±24V	

External Arm Input Specifications		
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	
External Arm Input Characteristics		
Impedance	1 k Ω	
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° to 50°C)	High Stability Oven (U6200-opt01 for U6200A only)
Temperature Stability (referenced to 25°C)	$\pm 1 \times 10E-6$	$\pm 5 \times 10E-9$
Aging Rate	Per Day Per Month Per Year	$\pm 8 \times 10E-10$
Turn-on stability vs. time (30 min.)	$\pm 2 \times 10E-6$	$\pm 8 \times 10E-8$ (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 k Ω	
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	570 mVpp (0 dBm), typical	
Impedance	50 Ω (typical), AC coupled	
Measurement Specifications		
Frequency, Period Channel 1 and 2	1 mHz to 400 MHz (2.5 ns to 1000 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)	

Frequency Ratio	CH 1/ CH 2, CH 1/ CH 3, CH 2/ CH 1, CH 3/ 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	
Time Interval	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+5 s	
Resolution	40 ps	
RMS Resolution	120 ps	
Systematic Uncertainty	$\pm(TI \times \text{Time Base Error}) \pm \text{Trigger Level Timing Error} \pm 500 \text{ ps Differential Channel Error}$	
Pulse Width Time	Measurement is specified over the full signal range of Channel 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+5 s	
Resolution	40 ps	
RMS Resolution	120 ps	
Systematic Uncertainty	$\pm (\text{Pulse Width Time} \times \text{Time Base Error}) \pm \text{Trigger Level Timing Error} \pm 500 \text{ ps Differential Channel Error.}$	
Rise/Fall Time	Measurement is specified over the full signal range of Channel 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+5 s	
Resolution	40 ps	
RMS Resolution	120 ps	
Systematic Uncertainty	$\pm (\text{Edge Time} \times \text{Time Base Error}) \pm \text{Trigger Level Timing Error} \pm 500 \text{ ps Differential Channel Error}$	
Phase	Measurement is specified over the full signal range of each input. 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	$\pm (\text{Trigger Level Timing Error}) \times \text{Frequency}$	
Duty Cycle	Measurement is specified over the full signal range of Channel 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	$\pm \text{Trigger Level Timing Error} \pm 500 \text{ ps Differential Channel Error}$	
Totalize	Measurement is specified over the full signal range of Channel 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	0 to 10E+15	
Resolution	1 count	
Systematic Uncertainty	$\pm 1 \text{ count}$	
Peak Voltage	Results Range	-5.1 V to + 5.1 V
	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, 50 Ω, 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 references only. Tres is the resolution including effect of certain internal errors.

The differential channel Error terms which counted by many systematic uncertainty equations result channel-to-channel disaccord and internal noise. These issues can be improved by the TI calibration in the well-controlled temperature environment.

Preset Values and Save/Recall Information

		Value at *RST (GPIB Reset)	In Save/Recall	In non-volatile memory
Input Impedance	CH1	1E+60hms	yes	no
	CH2	1E+60hms	yes	no
Input Attenuation	CH1	x1	yes	no
	CH2	x1	yes	no
Trigger Level	CH1 (percent)	50	yes	no
	CH2 (percent)	50	yes	no
	CH1 (volts)	0	yes	no
	CH2 (volts)	0	yes	no
Trigger Slope	CH1	positive	yes	no
	CH2	positive	yes	no
Sensitivity	CH1	medium	yes	no
	CH2	medium	yes	no
Scale		1	yes	no
Offset		0	yes	no
Limits parameters	Limit test on/off	off	yes	no
	On fail stop/go on	go on	yes	no
	Lower limit	0	yes	no
	Upper limit	0	yes	no
Stat parameters	Stats on/off	off	yes	no
	Measurement count	100	yes	no
	Display measurement/stats	measurement	yes	no
	Use all/in limits	all	yes	no
	On-single measurement	1	yes	no
Timebase		auto	yes	no
Trigger Offset Cal Parameters	Channel 1 trigger offset Inp1 cal		no	yes
	Channel 2 trigger offset Inp2 cal		no	yes
	Channel 1 trigger offset Att1 cal		no	yes
	Channel 2 trigger offset Att2 cal		no	yes
Trigger Gain Cal Parameters	Channel 1 trigger gain Inp1 cal		no	yes
	Channel 2 trigger gain Inp2 cal		no	yes
	Channel 1 trigger gain Att1 cal		no	yes
	Channel 2 trigger gain Att2 cal		no	yes
Time Interval Offset Cal Parameters	Fine1		no	yes
	Fine2		no	yes
	Quick		no	yes
Timebase cal Parameters			no	yes

General Specifications

Item	Limitation & description
Power Supply Voltage	100V/240V ± 10% 50Hz~60Hz ± 10%
	100V/120V ± 10% 400Hz ± 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
Operating Environment	0 to 55°C
Storage Temperature	- 40°C to 70°C
Operating Altitude	Up to 2000m
Bench Dimensions (WxHxD)	210mm x 85mm x 350mm
Weight	3200g
Safety	IEC61010-1:2001/EN61010-1:2001 (2nd Edition)
EMC	EN61326, IEC61000-3, IEC61000-4
Warm-up Time	1 Hour
Warranty	1 Year
Accessory	<ol style="list-style-type: none"> 1. U6200-opt01: High Stability Oven 2. U6200-opt02: 250 MHz~20 GHz Input Channel 3. 3. U6200-opt04: Rear panel input module (CH1/CH2) 4. U6200-opt05: Rear panel input module (CH1/CH2/CH3) 5. M3500-opt04: GPIB Card

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