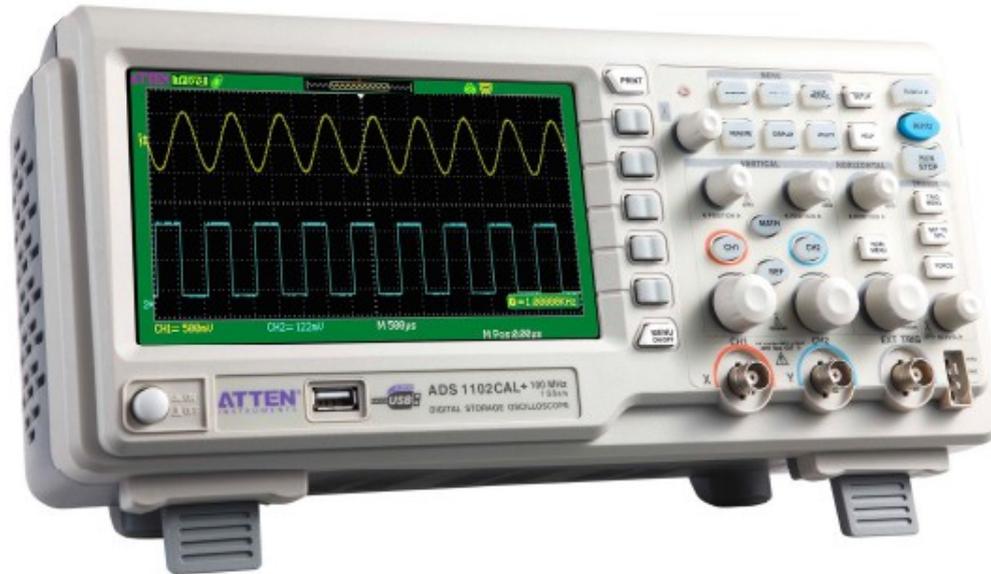


# Seria ADS1000CAL+/ CML+/ CE+

CYFROWY OSCYLOSKOP

100MHz, 200MHz, 300MHz



## GŁÓWNE CECHY:

- Częstotliwość próbkowania 1GSa/s & 2GSa/s
- 2 kanały
- 7" kolorowy wyświetlacz LCD (800 \* 480)
- Port USB Host: obsługa drukarek, pamięci
- Oprogramowanie współpracujące z oscyloskopem

## ZASTOSOWANIE:

- W przemyśle do wykrywania problemów w produkcji, projektowania, instalacji, utrzymania ciągłości produkcji
- Do projektowania i testowania systemów elektronicznych, znajdowania uszkodzeń, w laboratoriach R&D
- Do projektowania obwodów elektronicznych
- W laboratoriach badawczych i w edukacji do szkoleń
- W serwisach do napraw
- Do kontroli jakości produkcji

## FUNKCJONALNOŚĆ

- Wysoka częstotliwość próbkowania 1Gsa/s & 2GSa/s
- Pamięć: Seria CAL+ : 40Kpts;  
Seria CML+ : 2Mpts;  
Seria CE+ : 64Kpts
- Trigger (wyzwalanie): krawędzią, impulsem, video, szybkością zbrocza, naprzemiennie, Timeout
- Funkcja cyfrowego filtra oraz rejestrator przebiegów
- Wsparcie dla funkcji Pass/Fail.
- 32 funkcje automatycznego pomiaru
- Tryby Save/Recall: ustawień, przebiegów, pliki danych typu CSV, obraz
- Wielojęzyczne Menu, help, wsparcie
- Regulacja natężenie przebiegu fali oraz jasności siatki
- Standardowy port:
  - USB Host: USB pendrive, zapisywania i przenoszeni przebiegów, ustawień, aktualizacja firmware ;
  - USB Device: wspomaganie drukowania, pilot zdalnego sterowania, wyjście PASS/FAIL

- ADS1102CAL+  
100MHz, 1GSa/s, 2 Kanały
- ADS1202CAL+  
200MHz, 1GSa/s, 2 Kanały
- ADS1102CML+  
100MHz, 1GSa/s, 2 Kanały
- ADS1202CML+  
200MHz, 1GSa/s, 2 Kanały
- ADS1102CE+  
100MHz, 2GSa/s, 2 Kanały
- ADS1202CE+  
200MHz, 2GSa/s, 2 Kanały
- ADS1302CE+  
300MHz, 2GSa/s, 2 Kanały

MODEL	ADS1102CAL+	ADS1202CAL+	ADS1102CML+	ADS1202CML+	ADS1102CE+	ADS1202CE+	ADS1302CE+
Pasmo	100MHz	200MHz	100MHz	200MHz	100MHz	200MHz	300MHz
Próbkowanie	1GSa/s				2GSa/s		
Pamięć	40Kpts		2Mpts		64Kpts		
Czas narastania	≤3.5ns	≤1.7ns	≤3.5ns	≤1.7ns	≤3.5ns	≤1.7ns	≤1.1ns
Impedancja wejściowa	1M ±2%    20pF±3 pF						
Zakres podstawy czasu	4ns/dz~40s/dz						
Wyświetlacz	7" LCD kolorowy (800*480)						

## FEATURES

### Abundant Trigger Function

ADS1000+ series products have rich trigger modes: Edge, pulse, video, slope, timeout, alternate mode, which satisfy with users more extensive needs. Alternative trigger mode is usually used to observing two non-correlated signals at the same time and users can select different trigger mode for two channels, which is a kind reproduction that analog oscilloscope function in the digital oscilloscope.

### Digital Filter Function

ADS1000+ series provide a digital filter function, and users can use it setting upper limit and lower limit of frequency to reduce signal noise and filter error signal. So they can observe their interested signals distinctly, which will advance users' work efficiency consumedly.

### Auto Measure Function

ADS1000+ series can auto measure thirty two parameters, which is most in the same level digital oscilloscopes. Auto measure function can eliminate user error consumedly, and users will measure parameters what they need faster and more accurately using it.

ADS1000+ series also have all measurement function that displays all the waveform parameters on the screen according to measure kinds, and users can ready measure parameters value expediently making ADS1000+ series the most perfect measure tools

### Pop-up Menu Display Mode

The menu may hide as necessary make waveforms display on 18 divides full screen. Comparing with other same level digital oscilloscopes, this kind of pattern is more flexible, the user operation is more convenient and users can observe waveforms clearly.

### Waveform Recorder Function

Using this function, Users can continue record data of their need signals as the form of frame. Waveform recorder can record input waveform from CH1 and CH2, with maximum record length of 1000 frames. This record behavior can also be activated by the pass/fail test output, which makes this function especially useful to capture abnormal signals in long term without keeping an eye watching it.

### Display

ADS1000+ series products use the 7" Wide Screen Color TFT LCD. The screen display parameter value and the waveform are clearer, stably and nature; That is also more advantageous to alleviate tiredness of users using the instrument extended periods at a time.

### FFT Waveform Split Display Function

FFT waveform and its Channel waveform can display on split screen at the same time. In split display mode, the screen is divided into two parts and each part is divided eight divides in vertical direction. That is similar to under the entire screen pattern simultaneously to observe two waveforms. This way will make users observe waveforms to be clearer and convenient.

### Pass/Fail Function

Users may use the Pass/Fail function which the ADS1000+ series provides to carry on the product test. Through a series of setups, the oscilloscope can output the test result automatically which enhanced the product production efficiency greatly.

### Cursor Survey Function

ADS1000+ series cursor survey function has three kinds of modes: Auto manual mode, Track mode, Auto mode. The user may according to own need to choose the survey pattern nimbly, thus with ease read measure results from the top right of the screen or experience completely automatic intelligent design pattern.

### Powerful Digital Scope Software

Digital Scope software is the powerful system software suitable for ADS1000+ series products. This software can realize communication between the computer and the oscilloscope by the USB Device, then realizes long-distance control. Simultaneously this software can automatic real-time refresh waveform data, provide waveforms measure data sampling data, screen images read storage and printing functions. In addition Digital Scope also has setups upload and download function. Most quickly basing on millisecond level interactive between PC and ADS1000+ series make users to be easier to analyze, research waveforms and data.

# TECHNICAL SPECIFICATIONS

## HORIZONTAL SYSTEM

Model	ADS1102CAL+	ADS1202CAL+	ADS1102CML+	ADS1202CML+	ADS1102CE+	ADS1202CE+	ADS1302CE+
Częstotliwość próbkowania	1GS/s		1GS/s		2GS/s		
Pamięć	40Kpts		2Mpts		64Kpts		
Waveform Interpolation	(sin x)/x						
SEC/DIV Range	4ns/div to 40s/div, in a 2, 4, 8 sequence						
Sample Rate and Delay Time Accuracy	±50ppm over any ≥1ms time interval						
Delta Time Measurement Accuracy (Full Bandwidth)	Single-shot, Normal mode ± (1 sample interval + 100ppm × reading + 0.6ns)						
	>16 averages ± (1 sample interval + 100ppm × reading + 0.4ns)						
	Sample interval = s/div ÷ 200						
Position Range	20ns/div to 80 s/div				(-8div × s/div) to 40ms		
	200 s/div to 40s/div				(-8div × s/div) to 400s		

## VERTICAL SYSTEM

A/D Converter	8-bit resolution, each channel sampled simultaneously						
Channels	2						
VOLTS/DIV Range	2mV/div to 5V/div at input BNC						
Position Range	2mV/div to 200mV/div, ±2V >200mV/div to 5V/div, ±50V						
Analog Bandwidth in Normal and Average modes at BNC or with probe, DC Coupled	2mV/div to 20mV/div, ±400mV 50mV/div to 200mV/div, ±2V 500mV/div to 2V/div, ±40V 5V/div, ±50V						
Selectable Analog Bandwidth Limit, typical	20MHz						
Low Frequency Response (-3db)	≤10Hz at BNC						
Rise Time at BNC, typical	ADS1102CAL+	ADS1202CAL+	ADS1102CML+	ADS1202CML+	ADS1102CE+	ADS1202CE+	ADS1302CE+
	≤3.5ns	≤1.7ns	≤3.5ns	≤1.7ns	≤3.5ns	≤1.7ns	≤1.1ns
DC Gain Accuracy	±3% for Normal or Average acquisition mode, 5V/div to 10mV/div ±4% for Normal or Average acquisition mode, 5mV/div to 2mV/div						
DC Measurement Accuracy, Average Acquisition Mode	Measurement Type: Average of ≥16 waveforms with vertical position at zero Accuracy: ± (3% × reading + 0.1div + 1mV) when 10mV/div or greater is selected  Measurement Type: Average of ≥16 waveforms with vertical position not at zero Accuracy: ± [3% × (reading + vertical position) + 1% of vertical position + 0.2div] Add 2mV for settings from 2mV/div to 200mV/div; add 50mV for settings from 200mV/div to 5V/div						
Volts Measurement Repeatability,	Delta volts between any two averages of ≥16 waveforms acquired under same setup and ambient conditions						

Note: Bandwidth reduced to 6MHz when using a 1X probe.

TRIGGER

Trigger Sensitivity (Edge Trigger Type)	Coupling	Sensitivity
	DC	CH1/CH2 1div from DC to10MHz;1.5div from 10MHz to100MHz; 2div from 100MHz to 200MHz
	EXT	200mV from DC to 40MHz
	EXT/5	1V from DC to 40MHz
	AC	Attenuates signals below 10Hz
	HF Reject	Attenuates signals above 80kHz
	LF Reject	Same as the DC-coupled limits for frequencies above 150kHz; attenuates signals below 150kHz
Trigger Level Range	Source	Range
	CH1, CH2	±8 divisions from center of screen
	EXT	±1.2V
	EXT/5	±6V
Trigger Level Accuracy, typical (Accuracy is for signals having rise and fall times ≥20ns)	Source	Accuracy
	CH1, CH2	0.2div × volts/div within ±4 divisions from center of screen
	EXT	± (6% of setting + 40mV)
	EXT/5	± (6% of setting + 200mV)
Set Level to 50%,typical	Operates with input signals ≥50Hz	
Note: Bandwidth reduced to 6MHz when using a 1X probe.		
Video Trigger Type	Source	Range
	CH1, CH2	Peak-to-peak amplitude of 2 divisions
	EXT	400mV
	EXT/5	2V
Signal Formats and Field Rates, Video Trigger Type	Supports NTSC, PAL and SECAM broadcast systems for any field or any line	
Holdoff Range	100ns to 10s	
Pulse Width Trigger		
Pulse Width Trigger Mode	Trigger when < (Less than), > (Greater than), = (Equal), or ≠ (Not Equal); Positive pulse or Negative pulse	
Pulse Width Trigger Point	Equal: The oscilloscope triggers when the trailing edge of the pulse crosses the trigger level. Not Equal: If the pulse is narrower than the specified width, the trigger point is the trailing edge. Otherwise, the oscilloscope triggers when a pulse continues longer than the time specified as the Pulse Width. Less than: The trigger point is the trailing edge.	
	Greater than (also called overtime trigger): The oscilloscope triggers when a pulse continues longer than the time specified as the Pulse Width.	
Pulse Width Range	Selectable from 20ns to 10s	
Slope Trigger		

Slope Trigger Mode	Trigger when < (Less than), > (Greater than), = (Equal), or ≠ (Not Equal); Positive slope or Negative slope
Slope Trigger Point	Equal: The oscilloscope triggers when the waveform slope is equal to the set slope. Not Equal: The oscilloscope triggers when the waveform slope is not equal to the set slope. Less than: The oscilloscope triggers when the waveform slope is less than the set slope. Greater than: The oscilloscope triggers when the waveform slope is greater than the set slope.
Time Range	Selectable from 20ns to 10s
Overtime Trigger	The leading edge: Rising edge or Falling edge; Time Setting: 20-10s
Swap Trigger	
CH1	Internal Trigger: Edge, Pulse Width, Video, Slope
CH2	Internal Trigger: Edge, Pulse Width, Video, Slope
Trigger Frequency Counter	
Readout Resolution	6 digits
Accuracy (typical)	±30ppm (including all frequency reference errors and ±1 count errors)
Frequency Range	AC coupled, from 4Hz minimum to rated bandwidth
Signal Source	Pulse Width or Edge Trigger modes: all available trigger sources The Frequency Counter measures trigger source at all times, including when the oscilloscope acquisition pauses due to changes in the run status, or acquisition of a single shot event has completed. Pulse Width Trigger mode: The oscilloscope counts pulses of significant magnitude inside the 1s measurement window that qualify as triggerable events, such as narrow pulses in a PWM pulse train if set to < mode and the width is set to a relatively small time. Edge Trigger mode: The oscilloscope counts all edges of sufficient magnitude and correct polarity. Video Trigger mode: The Frequency Counter does not work.

## ACQUISITION

Acquisition Modes	Normal, Peak Detect and Average	
Acquisition Rate, typical	Up to 2000 waveforms per second per channel (Normal acquisition mode, no measurement)	
Single Sequence	Acquisition Mode	Acquisition Stop Time
	Normal, Peak Detect	Upon single acquisition on all channels simultaneously
	Average	After N acquisitions on all channels simultaneously, N can be set to 4, 8, 16, 32, 64 or 128

## INPUTS

Input Coupling	DC, AC or GND	
Input Impedance, DC coupled	1M ±2% in parallel with 20pF±3pF	
Probe Attenuation	1X, 10X	
Supported Probe Attenuation Factors	1X, 10X, 100X, 1000X	
Maximum Input Voltage	Overvoltage Category	Maximum Voltage
	CAT I and CAT II	300VRMS (10×), Installation Category
	CAT III	150VRMS (1×)
	Installation Category II: derate at 20dB/decade above 100kHz to 13V peak AC at 3MHz* and above. For non-sinusoidal waveforms, peak value must be less than 450V. Excursion above 300V should be of less than 100ms duration. RMS signal level including all DC components removed through AC coupling must be limited to 300V. If these values are exceeded, damage to the oscilloscope may occur.	

Measurements	
Cursors	Voltage difference between cursors: $\Delta V$ Time difference between cursors: $\Delta T$ Reciprocal of $\Delta T$ in Hertz ( $1/\Delta T$ )
Automatic Measurements	Frequency, Period, Mean, Peak-to-peak, Cycle RMS, Minimum, Maximum, Rise Time, Fall Time, Positive Width, Negative Width

## GENERAL SPECIFICATIONS

### Display

Display Type	7 inch 64K color TFT (Liquid Crystal Display)
Display Resolution	800 horizontal by 480 vertical pixels
Display Contrast	Adjustable (16 gears) with the progress bar

### Probe Compensator Output

Output Voltage, typical	About 5Vpp into $\geq 1M$ load
Frequency, typical	1kHz

### Power Supply

Supply Voltage	100-120VACRMS( $\pm 10\%$ ), 45Hz to 440Hz, CAT II 120-240VACRMS( $\pm 10\%$ ), 45Hz to 66Hz, CAT II
Power Consumption	<30W
Fuse	2A, T rating, 250V

### Environmental

Temperature	Operating: 32°F to 122°F (0°C to 50°C)	
	Non-operating: -40°F to 159.8°F (-40°C to +71°C)	
Cooling Method	Convectonal	
Humidity	+104°F or below (+40°C or below): $\leq 90\%$ relative humidity	
	106°F to 122°F (+41°C to 50°C): $\leq 60\%$ relative humidity	
Altitude	Operating and Non-operating	3,000m (10,000 feet)
	Random Vibration	0.31gRMS from 50Hz to 500Hz, 10 minutes on each axis
	Non-operating	2.46gRMS from 5Hz to 500Hz, 10 minutes on each axis
Mechanical Shock	Operating	50g, 11ms, half sine

### Mechanical

Size	Length	339mm
	Height	110.5mm
	Depth	148.5mm
Weight	2.4Kg (Excluding of packing and Accessories)	

We pursue a policy of continuous development and product improvement. Thus the specifications and picture in this Spec sheet and control location on the front panel may be changed.



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