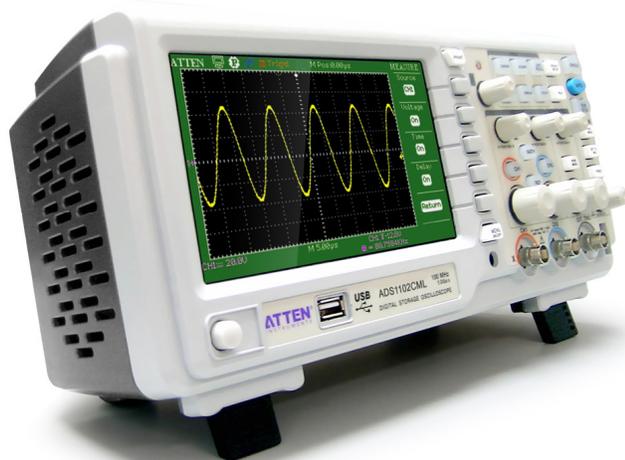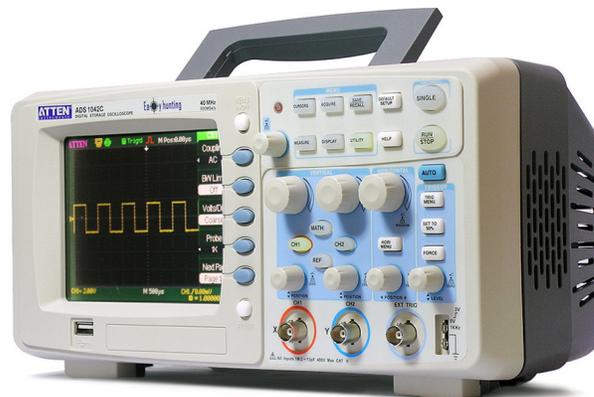# ADS1000C, CAL / CML Series

## DIGITAL STORAGE OSCILLOSCOPE

**25MHz, 40MHz , 60MHz , 100MHz, 150MHz, 200MHz**

**ADS1000 CAL/CML**

**ADS1000 C Series**

## FEATURES

- 500MSa/s & 1GSa/s Sampling Rate
- 2 Channels
- 7" Widescreen LCD Color Display (ADS1022C: 5.7 in)
- USB Host/Device: Support USB Printer and USB Flash Drive
- PictBridge Function
- Easyscope Software
- 12 Languages

## APPLICATIONS

- Industrial Power Design, Troubleshooting, Installation, and Maintenance.
- Electronics Design, Troubleshooting, Installation, and Maintenance
- Circuit Design & Debug
- Educational Lab & Training Institutions
- Repair & Service
- Production Test & Quality Inspection

## CHARACTERISTICS

- The highest Single real-time sampling rate can up to 1Gsa/s; Equivalent sampling rate is up to 50GSa/s.

  Memory Depth: C Series: 4Kpts

  CAL Series: 40Kpts

  CML Series: 2Mpts

- Max recording length:6Mpts
- The longest single recording time: 33.3h
- Trigger types: Edge, Pulse Width, Video, Slope, Alternative
- Unique Digital Filter function and Waveform recorder function
- Support Pass/Fail function.
- Thirty two parameters Auto measure function.
- Save/recall types: Setups, Waveforms, CSV file, Picture.
- Support Multilingual On-line help system
- Waveform Intensity and Grid Brightness can be adjusted.
- User Interface in 12 Language
- Standard Configuration Port:

  USB Host: Support USB flash driver save/recall function and update firmware;

  USB Device: Support PictBridge compatible printer and support PC remote control;  RS232, Pass/ Fail output

**ADS1022C**
25MHz, 500MSa/s, 2 Channel

**ADS1042CML**
40MHz, 1GSa/s, 2 Channel

**ADS1062CAL/CML**
60MHz, 1GSa/s, 2 Channel

**ADS1102CAL/CML**
100MHz, 1GSa/s, 2 Channel

**ADS1152CAL/CML**
150MHz, 1GSa/s, 2 Channel

**ADS1202CML**
200MHz, 1GSa/s, 2 Channel

| MODEL INDEX | ADS1202CML | ADS1152CAL/CML | ADS1102CAL/CML | ADS1062CAL/CML | ADS1042CML | ADS1022C |
|---|---|---|---|---|---|---|
| Bandwidth | 200MHz | 150MHz | 100MHz | 60MHz | 40MHz | 25MHz |
| Sampling Rate | 1GSa/s | | | | | 500MSa/s |
| Equivalent Sampling Rate | 50GSa/s | | | | | 10GSa/s |
| Memory Depth | 5Kpts/CH | Single Channel: 2Mpts; Double Channels: 1Mpts CAL Series: Single Channel: 40Kpts; Double Channels:20Kpts | | | | 4Kpts |
| Rise Time | < 1.8ns | <2.3ns | <3.5ns | <5.8ns | <8.8ns | <14ns |
| Input Impedance | 1MΩ\|\|14Pf / 50 ohm | 1MΩ\|\|17pF | | | | |
| Sec/div Range | 2.5ns/div-50s/div | | | 5ns/div-50s/div | 10ns/div-50s/div | 25ns/div-50s/div |
| | Scan: 100ms-50s/div | | | | | |
| Display | 7" LCD Color (480*234) | | | | | 5.7" LCD Color (320*234) |

## FEATURES

### Abundant Trigger Function

ADS1000 series products have rich trigger modes: Edge, Pulse, Video, Slope and Alternative 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.

### 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.

### 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.

### 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.

### 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.

### 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 1500 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.

### 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.

### 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.

### Multi-country Language User Interface Display function

ADS1000 series product has 12 languages user interface display function: Simplified Chinese, Traditional Chinese, English, Arabic, French, German, Russian, Spanish, Portuguese, Japanese and Korean, which has further developed the ADS1000 series product for the international market

### Powerful EasyScope3.0 Software

EasyScope3.0 software is the powerful system software suitable for ADS1000 series products. This software can be compatible RS-232 and USB Device to realize communication between the computer and the oscilloscope, 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

EasyScope3.0 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.

### 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.

## Input

| | | |
|---|---|---|
| | Input Coupling | AC, DC, GND |
| | Input Impedance | DC: 1MΩ+/-2% \|\| 17pF +/-3pF<br>AC: 1.2MΩ+/-2% \|\| 17pF +/-3pF, <=100mV/div<br>1.0MΩ+/-2% \|\| 17pF +/-3pF, >100mV/div |
| | Maximum Input Voltage | ±400V PK-PK CATI |
| | Ch to Ch Isolation (Both channels in same V/div setting) | > 100: 1 at 100MHz (ADS1202CML), > 100: 1 at 70MHz (ADS1152CAL/CML)<br>> 100: 1 at 50MHz (ADS1102CAL/CML), > 100: 1 at 30MHz (ADS1062CAL/CML)<br>> 100: 1 at 20MHz (ADS1042CML) |
| | Probe attenuator | 1X, 10X |
| | Probe attenuator | 1X, 10X, 100X, 1000X |

## Horizontal System

| | | |
|---|---|---|
| | Real Time Sampling Rate | Single Channel 1GSa/s; Double Channels 1GSa/s    (ADS1202CML)<br>Single Channel 1GSa/s; Double Channels 500MSa/s (ADS1000CAL/CML Series)<br>Single Channel 500MSa/S; Double Channels 250MSa/s (ADS1022C) |
| | Equivalent Sampling Rate | 50GSa/s |
| | Measure Display Modes | MAIN, WINDOW, WINDOW ZOOM, Scan, X-Y |
| | Timebase Accuracy | ±100ppm measured over 10ms interval |
| | Time Window | 18 Divisions |

| | | ADS1202CML | ADS1152CAL/CML | ADS1102CAL/CML | ADS1062CAL/CML | ADS1042CML | ADS1022C |
|---|---|---|---|---|---|---|---|
| | Horizontal Scan Range | 2.5ns/div -50s/div | | | 5 ns/div - 50s/div | 10 ns/div - 50s/div | 25ns/div - 50s/div |
| | | Scan: 100ms/div -50s/div (1-2.5-5 sequence) | | | | | |

## Vertical System

| | | |
|---|---|---|
| | Vertical Sensitivity | 2mV-10V/div at input BNC (1-2-5 order)<br>2mV-5V/div  (ADS1202CML / 1022C) |
| | Channel voltage offset range | 2mV-200mV: ±1.6V<br>206mV-10V: ±40V in Fixed Gain Ranges & Variable Gain Ranges |
| | Vertical Resolution | 8 bit |
| | Channels | 2 |

| | | ADS1202CML | ADS1152CAL/CML | ADS1102CAL/CML | ADS1062CAL/CML | ADS1042CML | ADS1022C |
|---|---|---|---|---|---|---|---|
| | Analog Bandwidth (at input BNC) | 200MHz | 150MHz | 100MHz | 60MHz | 40MHz | 25MHz |

| | | |
|---|---|---|
| | BW Flatness | DC-10% of rated BW: ±1DB<br>10%-50% of rated BW: ±2DB<br>50%-100% of rated BW: ±3DB |
| | Lower frequency limit (AC -3dB) | ≤10Hz (at input BNC) |
| | Noise: Pk-Pk for 3K record | ≤0.6Div for average of 10Pk-Pk readings in fixed gain settings.<br><=0.7 Div for average of 10 Pk-Pk readings, Variable gain settings |
| | SFDR including harmonics | ≥40dB |
| | DC Gain Accuracy | < ±3.0%: 5mV/div to 5V/div in Fixed Gain Ranges<br>< ±4.0%:typical for 2mV/div and Variable Gain Ranges |
| | DC Measurement Accuracy: All Gain settings ≤100mV/div | ±[3%X (\|reading\|+\|offset\|) +1% of \|offset\| +0.2div+2mV]<br>+0.2div+2mV] |
| | DC Measurement Accuracy: All Gain settings >100mV/div | ±[3%X (\|reading\|+\|offset\|) +1% of \|offset\|  +0.2div+100mV] |

| | | ADS1202CML | ADS1152CAL/CML | ADS1102CAL/CML | ADS1062CAL/CML | ADS1042CML | ADS1022C |
|---|---|---|---|---|---|---|---|
| | Rise time, Typical (using 500ps pulse) | <1.8ns | <2.3ns | <3.5ns | <5.8ns | <8.8ns | <14ns |

| | | |
|---|---|---|
| | Math operation | +,-, *,FFT |
| | FFT | Window mode: Hanning, Hamming, Blackman, Rectangular<br>Sampling points: 1024 |
| | Bandwidth limiter | 20MHz ±40% Typical<br>(Note: BW limited below 20MHZ±40% when using probe X1;25MHz BW don't have this function) |

## Trigger System

| | | |
|---|---|---|
| | Trigger Types | Edge, Pulse Width, Video, Slope, Alternative |
| | Trigger Modes | Auto, Normal, Single |
| | Trigger Sources | Ch1-2, EXT, EXT/5, AC Line |
| | Trigger Coupling | AC, DC, LF rej, HF rej |
| | Trigger Level Range | CH1, CH2: ±6divisions from center of screen<br>EXT: ±1.2V<br>EXT/5: ±6V |
| | Trigger Level Accuracy (typical) applicable for the signal of rising and falling time ≥20ns | Internal: ±(0.2 div x V/div)( within±4 divisions from center of screen)<br>EXT: ±(6% of setting + 40 mV)<br>EXT/5: ±(6% of setting + 200 mV) |
| | Edge Trigger | Edge type: Rising, Falling, Rising and Falling |
| | Pulse Width Trigger | Trigger Modes: (>, <,=) Positive Pulse Width, (>,<,=) Negative Pulse Width<br>Pulse Width Range: 20ns-10s |
| | Video Trigger | Support signal Formats: PAL/SECAM, NTSC<br>Trigger condition: odd field, even field, all lines, line Num |
| | Slope Trigger | (>,<,=) Positive slope, (>,<,=) Negative Slope<br>Time: 20ns-10s |
| | Alternative Trigger | CH1 trigger type: Edge, Pulse, Video, Slope<br>CH2 trigger type: Edge, Pulse, Video, Slope |

## Control Panel Function

| | | |
|---|---|---|
| | Auto Set | Auto adjusting the Vertical, Horizontal system and Trigger Position |
| | Save/Recall | Support 2 Group referenced Waveforms, 20 Group setups, 20 Group captured Waveforms internal Storage/Recall function and USB flash driver storage function. |

## Hard Ware Frequency Counter

| | | |
|---|---|---|
| | Reading resolution | 6 Bytes |
| | Accuracy | ±0.01% |
| | Range | DC Couple, 10Hz to MAX Bandwidth |
| | Signal Types | Satisfying all Trigger signal (Except Pulse width trigger and Video Trigger) |

## Acquisition System

| | | |
|---|---|---|
| | Sample Types | Real time, Equivalent time |

Memory Depth:

ADS1202CML :5Kpts / CH
ADS1000CAL /CML Series: Single Channel  Kpts, ADS1022C: Single Channel 4Kpts ;

| ADS1000CML Series | | | |
|---|---|---|---|
| Channel Mode | Sampling Rate | Short memory | Long Memory |
| Single Channel | 1Gsa/s | 40kpts | No Support |
| Single Channel | 500MSa/s or lower | 40kpts | 2Mpts [#] |
| Double Channels | 500MSa/s or lower | 20kpts | 1Mpts [#] |

| | | |
|---|---|---|
| | Sample Mode | Sample, Peak Measure, Average |
| | Averages | 4,16,32,64,128,256 |

## Measure System

| | | |
|---|---|---|
| | Auto Measure | Vpp, Vmax, Vmin, Vamp, Vtop, Vbase, Vavg, Mean, Crms, Vrms, ROVShoot, FOVShoot, RPREShoot, FPREShoot, Rise time, Fall time, Freq, Period, +Wid, -Wid, +Dut, -Dut, Bwid, Phase, FRR, FRF, FFR, FFF,LRR,LRF, LFR, LFF |
| | Cursor Measure | Manual mode, Track mode and Auto mode |

# (only in ADS1000CML Series with Long Memory)
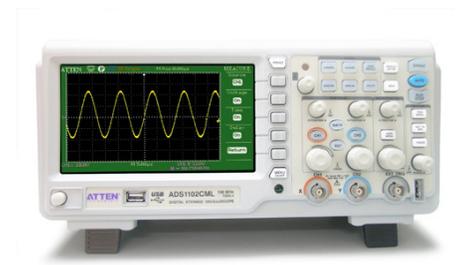
# GENERAL SPECIFICATIONS

## Display

| | |
|---|---|
| Display Mode | Color TFT  7in  diagonal Liquid Crystal Display |
| Resolution | 480 horizontal by 234 vertical pixels |
| Display Color | 64K color |
| Display Contrast (Typical state) | 150:1 |
| Backlight Intensity (Typical state) | 300nit |
| Wave display range | 8 x 18 div |
| Wave Display Mode | Point, Vector |
| Point, Vector | Off, 1 sec, 2 sec, 5 sec, Infinite |
| Menu Display | 2 sec, 5 sec, 10 sec, 20 sec, Infinite |
| Skin | Succinct |
| Screen saver | 1min, 2min, 5min, 10min,15min, 30min, 1hour, 2hour, 5hour, off |
| Waveform Interpolation | Sin(x)/x, Linear |
| Color model | Normal , Invert |
| Language | English, French, German, Russian, Spanish, Simplified Chinese, Traditional Chinese, Portuguese, Japanese, Korean, Italian, Arabic |
| Interface | USB Host, USB Device, RS232, Pass/Fail output |

## Environments

| | |
|---|---|
| Temperature | Operating:10℃ to + 40℃<br>Not operating: -20℃ to +60℃ |
| Humidity | Operating: 85%RH, 40℃, 24 hours<br>Not operating: 85%RH, 65℃, 24 hours |
| Height | Operating: 3000m<br>Not operating: 15,266m |

## Power Supply

| | |
|---|---|
| Input Voltage | 100-240 VAC, CAT II, Auto selection |
| Frequency Scope | 45Hz to 440Hz |
| Power | 50VA Max |

## Mechanical

| Dimension | Length | Width | Height |
|---|---|---|---|
| | 399mm | 110.5mm | 148.5mm |
| Weight | 2.4 kg | | |

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.

**ATTEN**®
I N S T R U M E N T S