LOTO

OSC482 series

USB Oscilloscope/Data logger Device Family

August 6, 2020, Version 15.0 | Data Sheet

Features:

- Hand-held portable, 153(L) x 93(W) x 23(H) mm, up to 210g.
- General Purpose I/O and PWM interface (TTL 3.3V) .
- 8 Bit ~ 13 Bit vertical resolution.
- Open source hardware interface to support expansion modules.
- USB 2.0 interface, USB powered.
- 72 hours long time data logger.
- Optional signal generator, logic analyzer, isolated differential input and Android smart phone support module.
- Waveform recording and playback review.
- Support waveform image import as the comparison reference for real-time waveform.
- Support Serial bus decoding (RS-232,RS-485/422, I²C, CAN,SPI).
- Supports a variety of current clamps and other physical volume custom probes.
- Support buffer waveform preview and mouse wheel operations.
- Historical change trend statistics and analysis functions.
- Pass / Fail detection.
- Support spectrum analysis and frequency response curve mapping.

APPLICATIONS:

- ✓ *General-purpose and precision testing.*
- ✓ *Embedded in industrial testing equipment for use.*
- ✓ *Embedded electronics courses for the educational market.*
- ✓ *Ripple and noise measurements for power supply characterization.*
- ✓ *Multi-sensor systems and Serial bus decoding.*
- ✓ *Car inspection and maintenance.*
- ✓ *Current/Voltage recording and analysis System for Solar Power Supply and Lighting System.*
- ✓ *Diagnosis device for field engineers.*
- ✓ *Basic equipment for DIY makers to develop their own modules.*

SPECIFICATIONS:

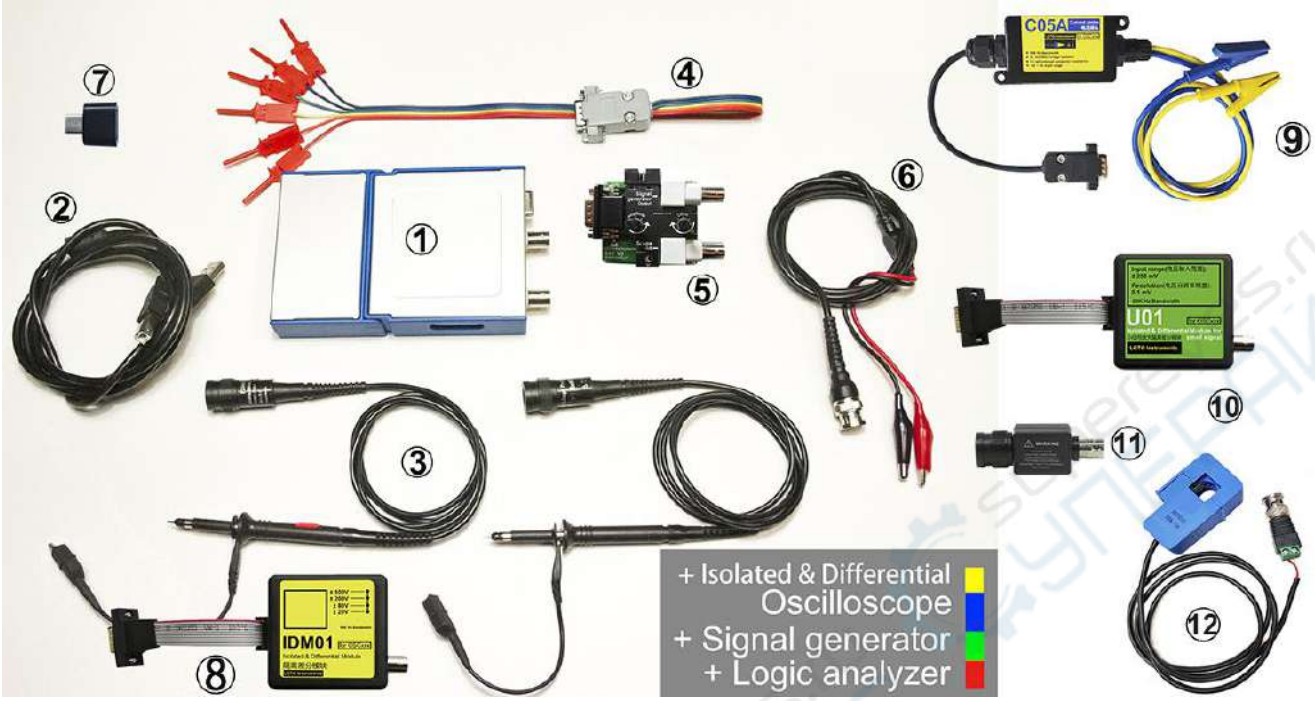
● Connector type :	2 channels with BNC sockets, 20 mm spacing.	
● Vertical resolution:	8 Bit ~ 13 Bit.	
● Maximum sampling rate (S/s):	50M	
● Bandwidth (−3 dB):	20MHz	
● Input coupling:	AC/DC.	
● Input characteristics:	1MΩ || 25pF.	
● PC OS requirements:	Windows XP, Win 7, Win 8.1, Win10 (32 bit and 64 bit).	
● Over-voltage protection:	±60.0v (x1), ±600.0v (x10). (DC + AC peak)	
● Triggering type:	Rising/falling edge according to trigger level.	
● Triggering mode:	None, auto, normal, single.	
● pre-trigger capture:	50% of capture size.	
● Automatic measurements:	Maximum, minimum, average, RMS, frequency, period, positive pulse width, negative pulse width, duty cycle, rise time, peak-to-peak value.	
● Frequency response mapping	Scanning the frequency, record the process frequency and magnification data, and draw the frequency response curve.	
● Measurement statistical curve:	The historical trend of the automatically measured quantities can be plotted for statistics and analysis.	
● Pass / Fail detection:	You can set the upper and lower limits of the measurement quantity, and perform Pass / Fail detection and fault alarm function on the measured signal.	
● Deep measurement:	With this function, the waveform jump points are automatically numbered and marked, and the time difference between the two adjacent numbers is automatically displayed.	
● Samples Interpolation:	Linear or sin(x)/x.	
● FFT:	1024 ~ 16k points.	
● FFT window function:	Rectangle, Hanning, Hamming, Blackman.	
● Math:	A+B, A-B, AxB, X-Y.	
● Acquisition Modes:	Normal mode / High Resolution mode / Peak detect mode.	
● Waveform recording and playback:	File format :	*.oscxxx.
	Record depth:	50 ~ 450 frames.
	File size:	6 MB ~ 20GB.
● Save as file:	txt, csv, excel, oscxxx, jpg.	
● Comparison reference	Support waveform image import and real-time waveform comparison reference. It can import waveform pictures, set gray level and transparency, move up and down, and zoom in and out horizontally and longitudinally.	
● Data logger Sampling Interval:	1 second to 1 hour.	
● Data logger Record Duration:	1 minute ~ 72 hours.	
● Temperature range:	Operating: 0 °C to 40 °C (20 °C to 30 °C for stated accuracy).	

		Storage: −20 °C to +60 °C.
● Reference Output:		1K Hz, 1.5 V square wave output with 50% duty cycle. Software-configurable PWM output with adjustable frequency and duty cycle, 200Hz~25K Hz, 10%~90%.
● Size:		153(L) x 93(W) x 23(H) mm.
● Languages (full support):		English, Chinese (simplified).
● Compliance:		CE, FCC.
● Net weight:		198 g.
● Input sensitivity (10 vertical divisions):		20 mV/div to 2 V/div.
● Input ranges(probe x1):		±100 mV to ±5 V full scale, in 7 ranges.
● Time base selection (10 horizontal divisions):		50 ns/div ~ 25 s/div, in 24 ranges.
● Typical noise (peak to peak voltage):	20 mV/div	2 mV
	50 mV/div	3.4 mV
	100 mV/div	6.4 mV
	200 mV/div	21 mV
	500 mV/div	32 mV
	1 V/div	101 mV
● GPIO:		3 I/O, One IO can use high and low levels to control the start and stop of PC software.
● Memory depth (byte):	1k	≤1 us/div
	64k	10 us/div
	64k	100 us/div
	64k	0.2 ms ~ 5 ms /div
	64k	10 ms /div
	256k	100 ms /div
	512k	200 ms /div
	1M	0.5 s/div
	2M	1 s/div
	5M	2 s/div
	12M	5 s/div
	25M	10 s/div
	37M	15 s/div
	50M	20 s/div
	62M	25 s/div
● Trigger type:		Software
● Trigger source:		Channel A
● Power consumption:		5 v || (238~253) mA
● Protocols decoding:		UART/RS-232/485/422, I²C,CAN,SPI
● Custom probes		Support two-point calibration of any current clamp on the market.

AT A GLANCE

Model:	OSC482	OSC482M	OSC482S	OSC482L	OSC482X	OSC482F	OSC482 H
Detail:	Support Windows.	Support both Windows and Android .	OSC482 + 13M Hz Signal generator.	OSC482 + 4 channels Logic analyzer.	OSC482+13 M Hz Signal generator + Logic analyzer.	OSC482M + 13M Hz Signal generator + Logic analyzer.	OSC482F + Isolated differentia l input model.
Input channels:	2	2	2	2	2	2	2
Maximum sampling rate :	50M S/s	50M S/s	50M S/s	50M S/s	50M S/s	50M S/s	50M S/s
Bandwidth:	20M Hz	20M Hz	20M Hz	20M Hz	20M Hz	20M Hz	20M Hz
FFT:	✓	✓	✓	✓	✓	✓	✓
Data logger:	✓	✓	✓	✓	✓	✓	✓
I/O extension:	✓	✓	✓	✓	✓	✓	✓
Decode:	✓	✓	✓	✓	✓	✓	✓
Signal generator module support:	✘	✘	✓	✘	✓	✓	✓
Logic analyzer module support:	✘	✘	✘	✓	✓	✓	✓
Android Phone/ Tablet support	✘	✓	✘	✘	✘	✓	✓
Isolated differential input model	Optional	Optional	Optional	Optional	Optional	Optional	✓
Custom probes	✓	✓	✓	✓	✓	✓	✓
Frequency response mapping	✓	✓	✓	✓	✓	✓	✓

Expansion modules & Accessories:



Model	Android phone support	Signal generator module	Logic analyzer module	Isolated differential input module	Bill of materials
OSC482	✘	✘	✘	Optional	①+②+③
OSC482M	✓	✘	✘	Optional	①+②+③ + ⑦
OSC482X	✘	✓	✓	Optional	①+②+③+④+⑤+⑥
OSC482L	✘	✘	✓	Optional	①+②+③+④
OSC482S	✘	✓	✘	Optional	①+②+③+⑤+⑥
OSC482F	✓	✓	✓	Optional	①+②+③+④+⑤+⑥+ ⑦
OSC482H	✓	✓	✓	✓	①+②+③+④+⑤+⑥+⑦+⑧
Custom model	The above standard model configuration does not cover all the module combinations. Users can also choose the host to match any one or several modules into a new model configuration.				

	type	quantity	model	details
①	Oscilloscope host device	1	OSC482	/
②	USB cable	1	U2100	USB2.0 compliant, length: 1m (or whatever length it is), USB Type A Male to USB Type B Male
③	Passive voltage probe, 60 MHz x1/x10	2	P2060	10x: 60M Hz,10MΩ,600 V CAT II 1x: 6M Hz,1MΩ,300 V CAT II
④	Logic analyzer module	1	L02	4 channels, TTL level, consistent with the performance of the host device.
⑤	Signal generator module	1	S02	1 channel, Sine wave, Triangle wave, Square wave.1 Hz ~ 13M Hz (Sine wave) output frequency range. 48M sampling rate.
⑥	Signal output cable	1	SO13	Output cable for Signal generator module S02.
⑦	Adapters for Android phone	1	A2C0	When the customer selects a model that supports the Android mobile app, the adapter will be installed as an accessory on the support phone jack.
⑧	Isolated differential input module	1	IDM01	Single channel, electrically isolated and differential input, can measure ± 20V to ± 800V high voltage, can be connected to the ground or reverse input. Bandwidth 50K Hz.
⑨	Current Probe	1	C05A/ C20A/ C30A	Current probe with 1.2 mΩ internal resistance and 1.2 KV isolation voltage protection. The range is ± 5A / ± 20A / ± 30A. Can be used with any LOTO oscilloscope host.
⑩	Small signal amplification module	1	U01	Input range ± 250mV, isolated differential input, resolution 0.1mV, 50K Hz bandwidth.
⑪	20:1 Attenuator	1	AN20	20: 1 attenuator. The external voltage signal can be attenuated by 20 times and input into the oscilloscope, effectively expanding the scope of the oscilloscope.
⑫	Current transformer module	1	AC05A/ AC20A/ AC30A/ AC50A/ AC100A	Current transformer module, open and close test, no need to access the circuit. Measuring frequency range 50Hz ~ 150K Hz. The model indicates the measurement range, such as

				AC100A, which means the range is 100A.

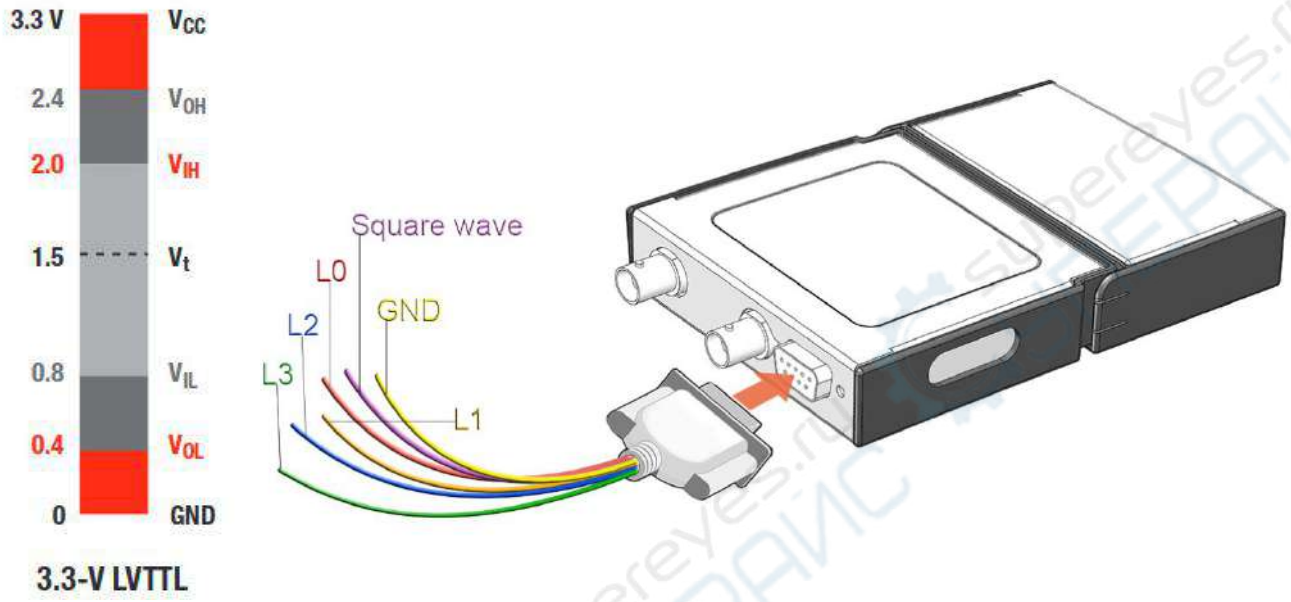
This ④, ⑤ and ⑥ , ⑦,⑧,⑨,⑩,⑪,⑫ are standard or optional, depending on the host you purchased. If the host you purchased supports the feature of the module and do not provide it as standard, then you can buy it separately as an optional one.

Users can also choose the carrying case to store the oscilloscope main unit and wiring and some modules, as shown below:

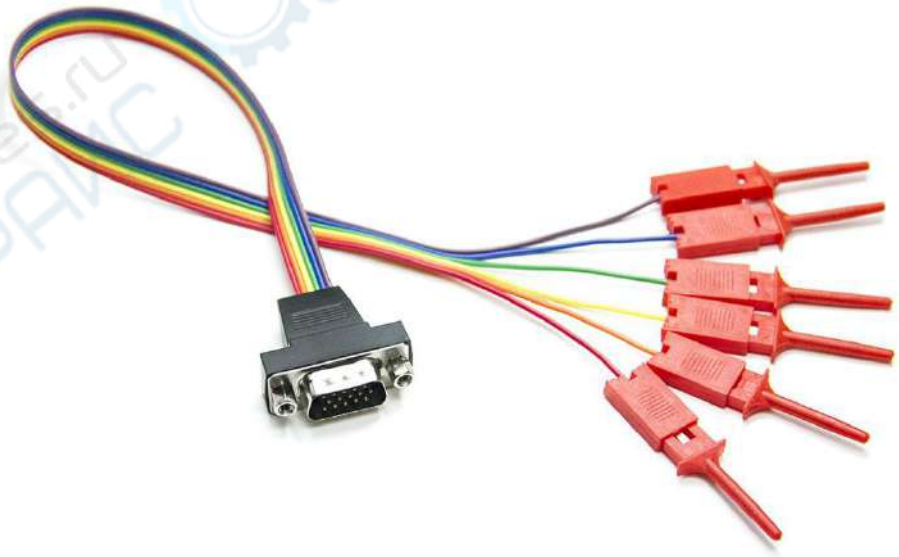
Or choose a box suitable for the user to display the scene, as shown below:

Logic Analyzer Module L02:

If the module is purchased later, the host needs to be added back to the factory.



The input voltage between 2V and 3.3V is considered to be high and the input voltage between 0.8V and 0V is considered to be low for the four channels input L0~L3 of the logic analyzer shown above.



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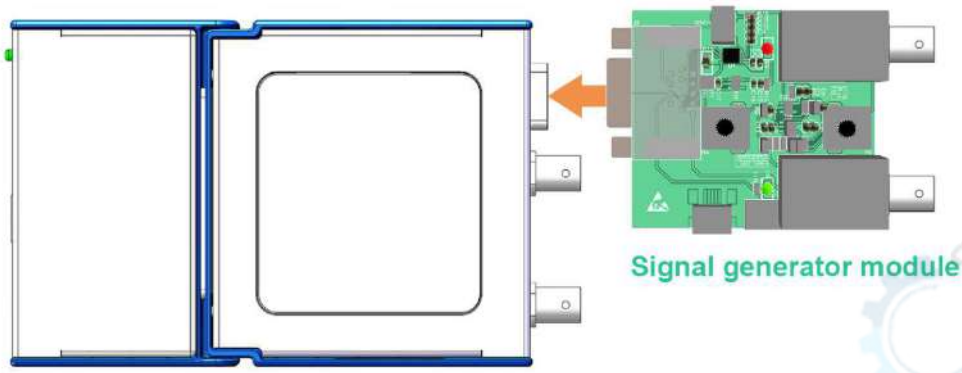
Signal Generator Module S02:

This module can be purchased later and added by itself.

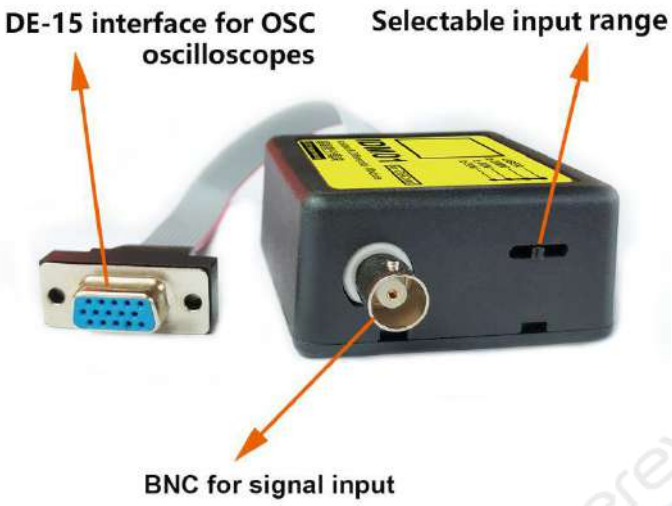


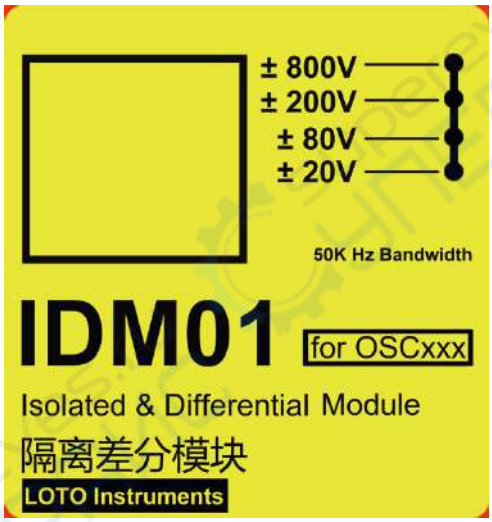
Signal generator module S02 specifications:

Number of channels	1	
Output waveform	Sine wave, triangle wave, square wave	
Amplitude range	-0 ~ 4V	
Amplitude resolution	50mV	
Amplitude noise	40mV ~ 80mV	
Frequency Range	Sine wave:	1Hz ~ 13M Hz
	Triangle wave:	1Hz ~ 8M Hz
	Square wave:	1Hz ~ 1M Hz
DC offset range	0 ~ 4V	
DC offset resolution	100mV	
Automatic frequency sweep	Software support	
Output stability	The output is stable after 30 seconds from the power-on	

Isolated differential module IDM01:

This module can be purchased later and added by itself. It can be used with LOTO OSC482 series, OSC802, OSCA02 series, OSC2002 series, OSC980, OSCH00 to realize voltage measurement in high voltage or none-zero grounding circuit.





items	Isolated differential module	
channel	1 (chB with OSCxxx Oscilloscope)	
Input characteristics:	1MΩ	
Maximum working insulation voltage	1200V	
Bandwidth	50K Hz	
Input range(4 grades)	20V	Input range -20V~+20V
	80V	Input range -80V~+80V
	200V	Input range -200V~+200V
	800V	Input range -800V~+800V

CxxA current probes:

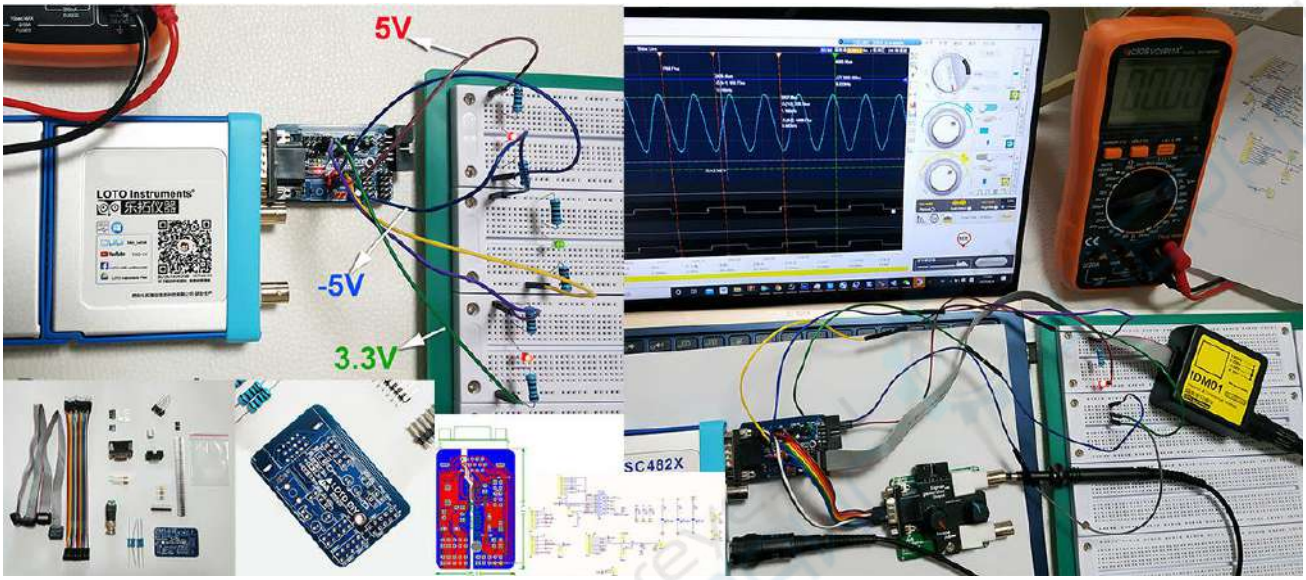
The current probe is connected to the oscilloscope through the extended DE-15 interface of the LOTO oscilloscope, which can be used with any LOTO oscilloscope host, and can be used later. The oscilloscope software has corresponding settings to directly support this series of current probes.

Internal resistance		1.2 mΩ
Isolation protection		1.2 KV
Bandwidth		50K Hz
Input range	**C05A**	±5A
	C20A	±20A
	C30A	±30A

DIY expansion board components:

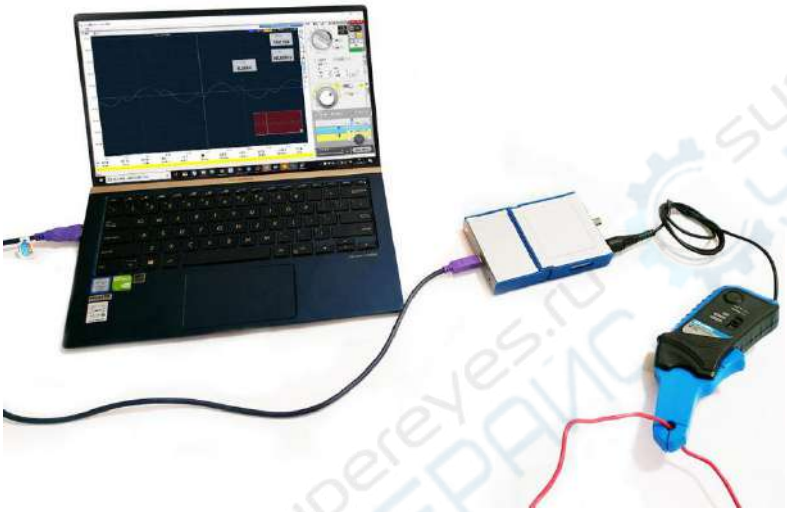
Users can make their own through open source materials or buy the components from vendors.

Use this DIY component to easily expand the parallel connection of positive and negative power supplies, IO ports, analog input and other functional modules.

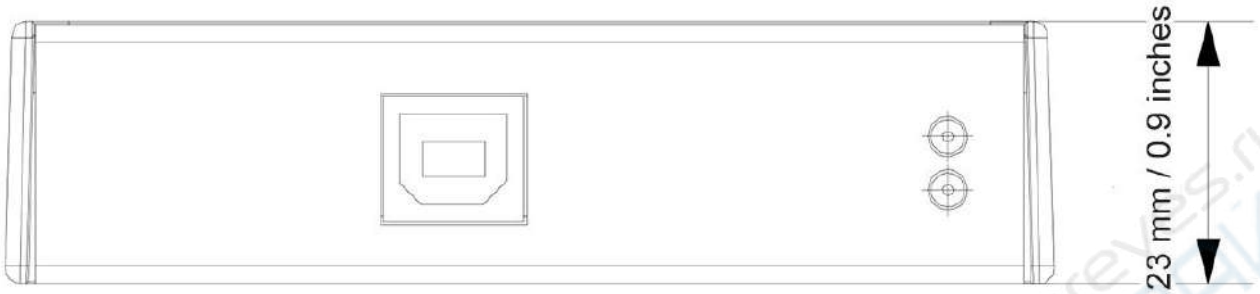


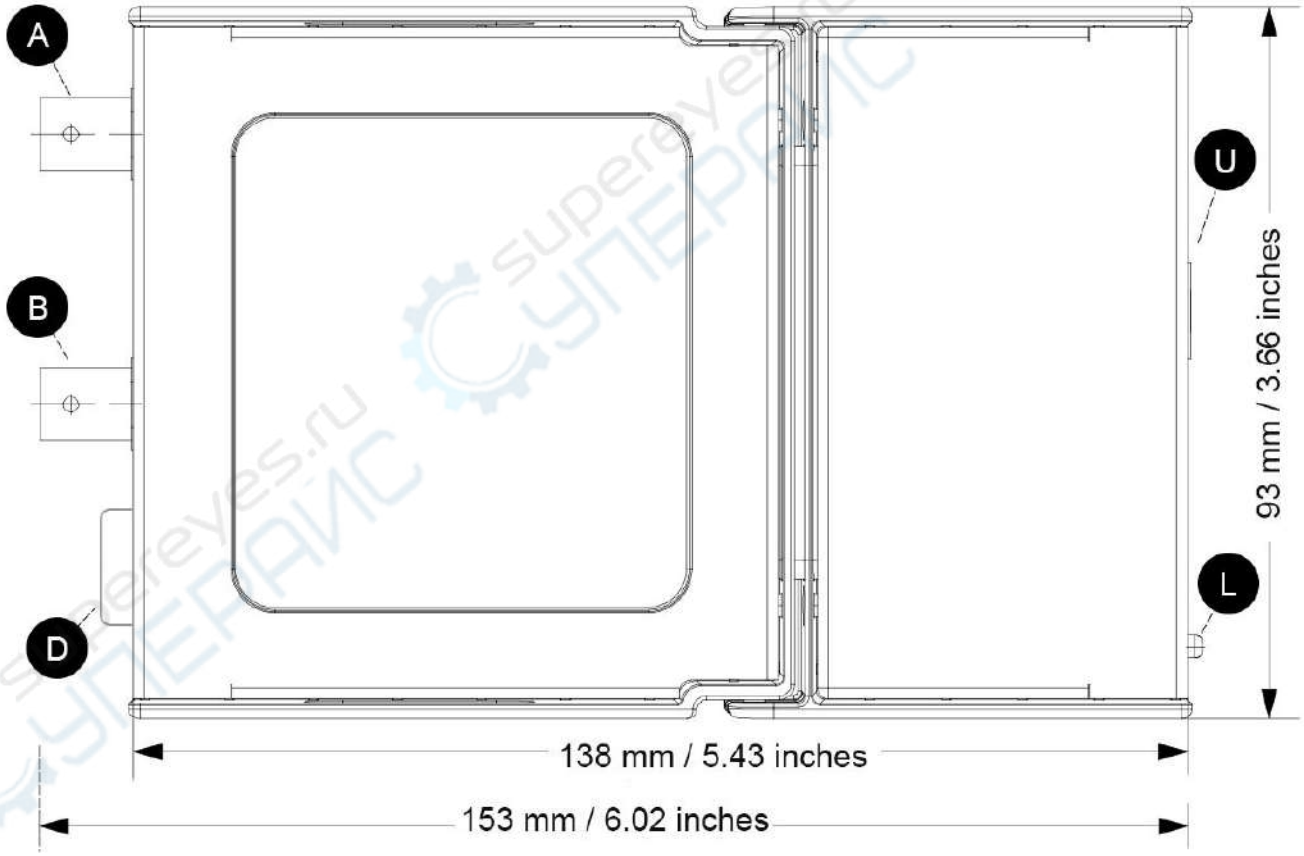
Custom probe:

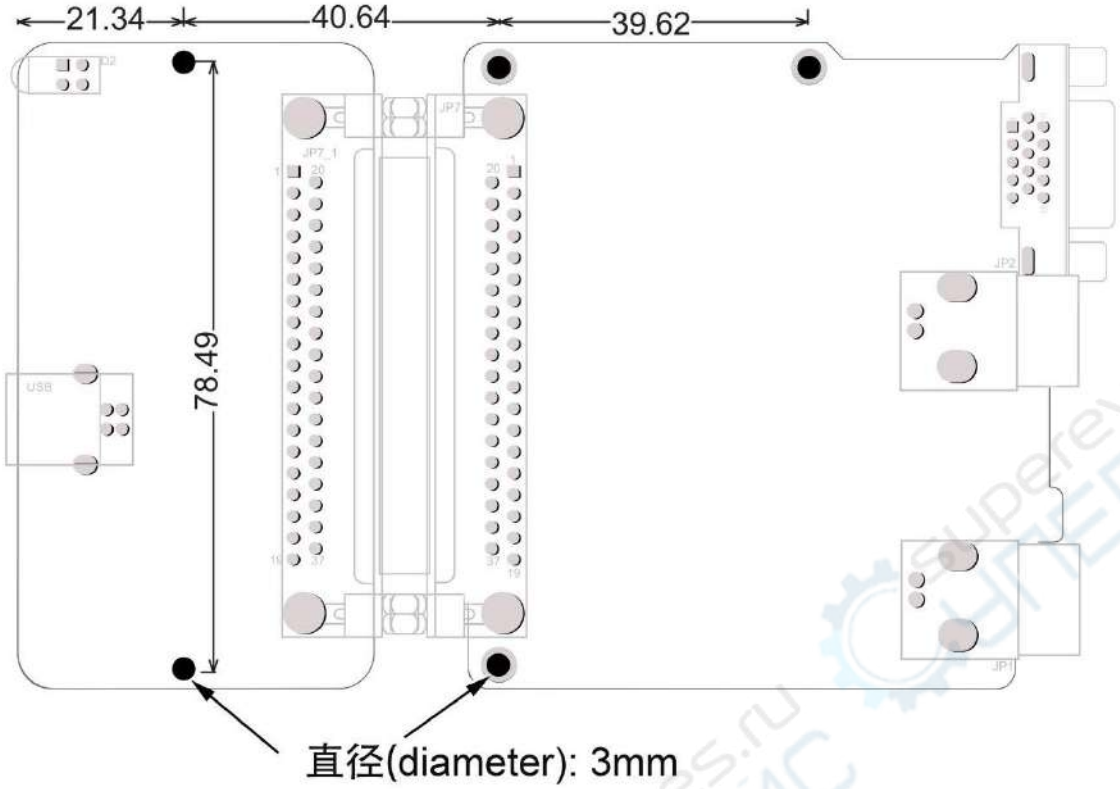
Pure software features, no additional purchase required. The most typical applications are current clamps. The software interface provides two sets of data calibration functions for custom probes. It allows users to purchase other physical probes of any BNC interface, such as current clamps. After the software is set, it displays the curves and data of the corresponding physical quantities.



INTERFACES:


23 mm / 0.9 inches

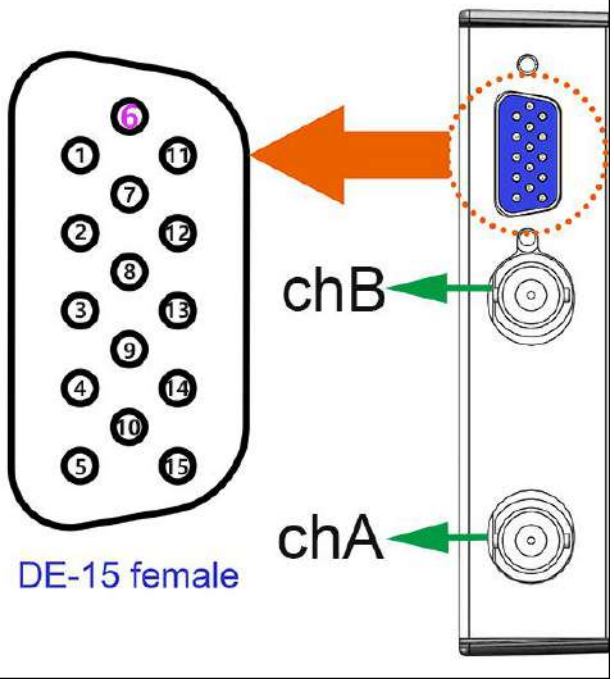

A
B
D
U
L
93 mm / 3.66 inches
138 mm / 5.43 inches
153 mm / 6.02 inches



	Description:
A	Input channel A.
B	Input channel B.
L	Power LED (red), Status LED (green).
U	USB 2.0 interface, Type B female.
D	DE-15 interface for expansion modules.

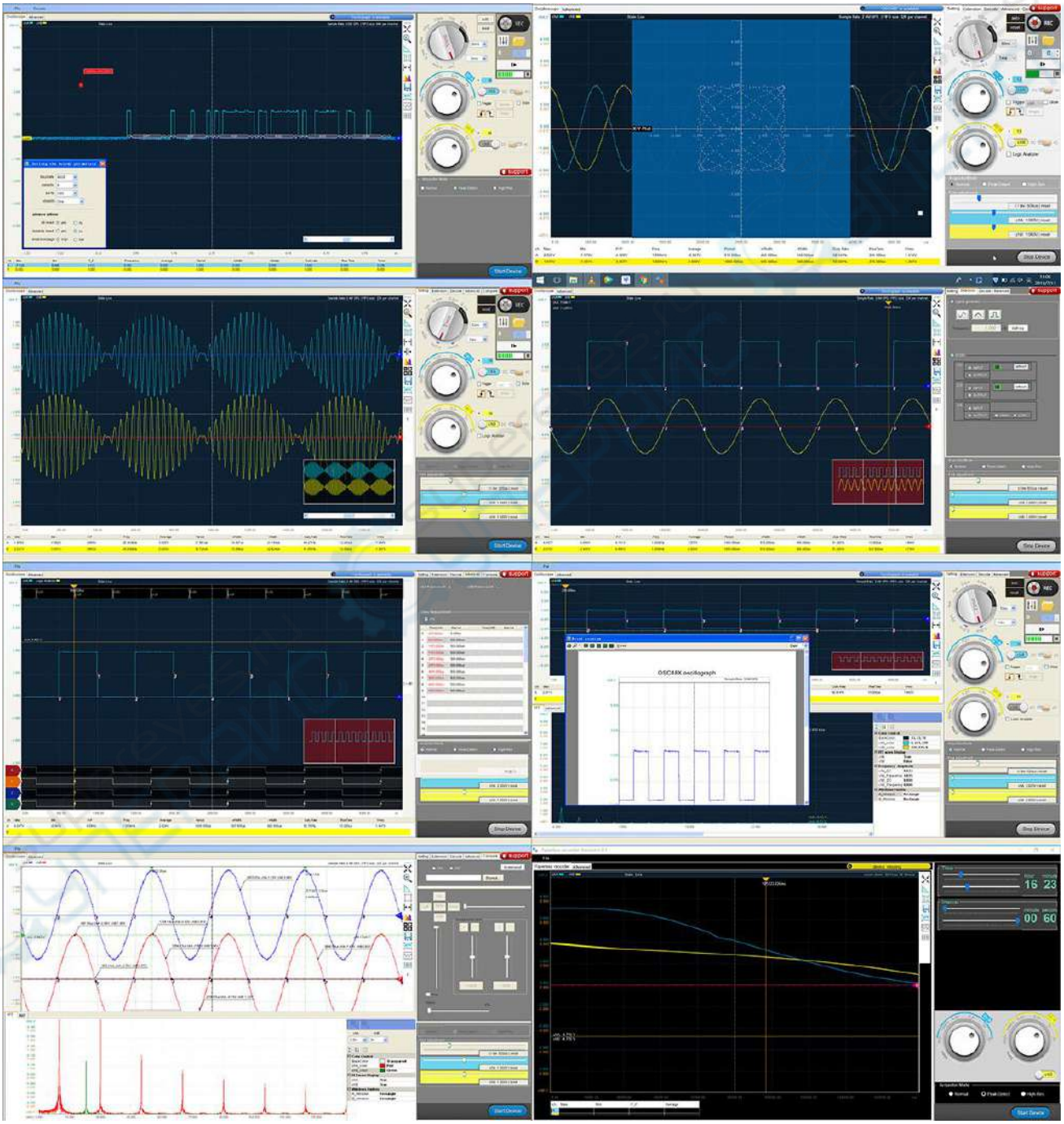
Note: *io1,io2 and io3 are only available for OSC48xx,*
L4 ,L5 and Ext trigger are not available for OSC48xx.

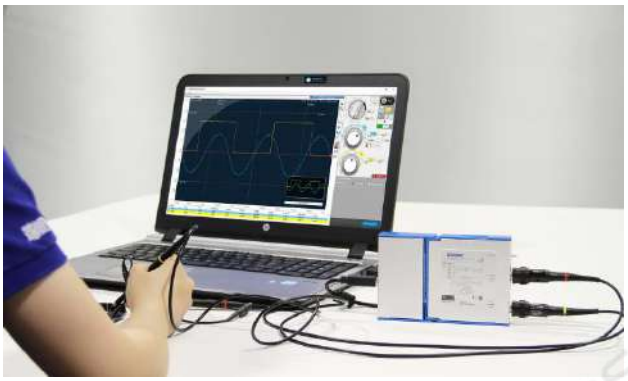
1: L0	9: L3
2: NC	10: io3 / L4
3: io2 /Ext trigger	11: L2
4: io1 / L5	12: 3.3V
5: chB input	13: -5V
6: square wave(1k)	14: 5V
7: L1	15: AGND
8: DGND	



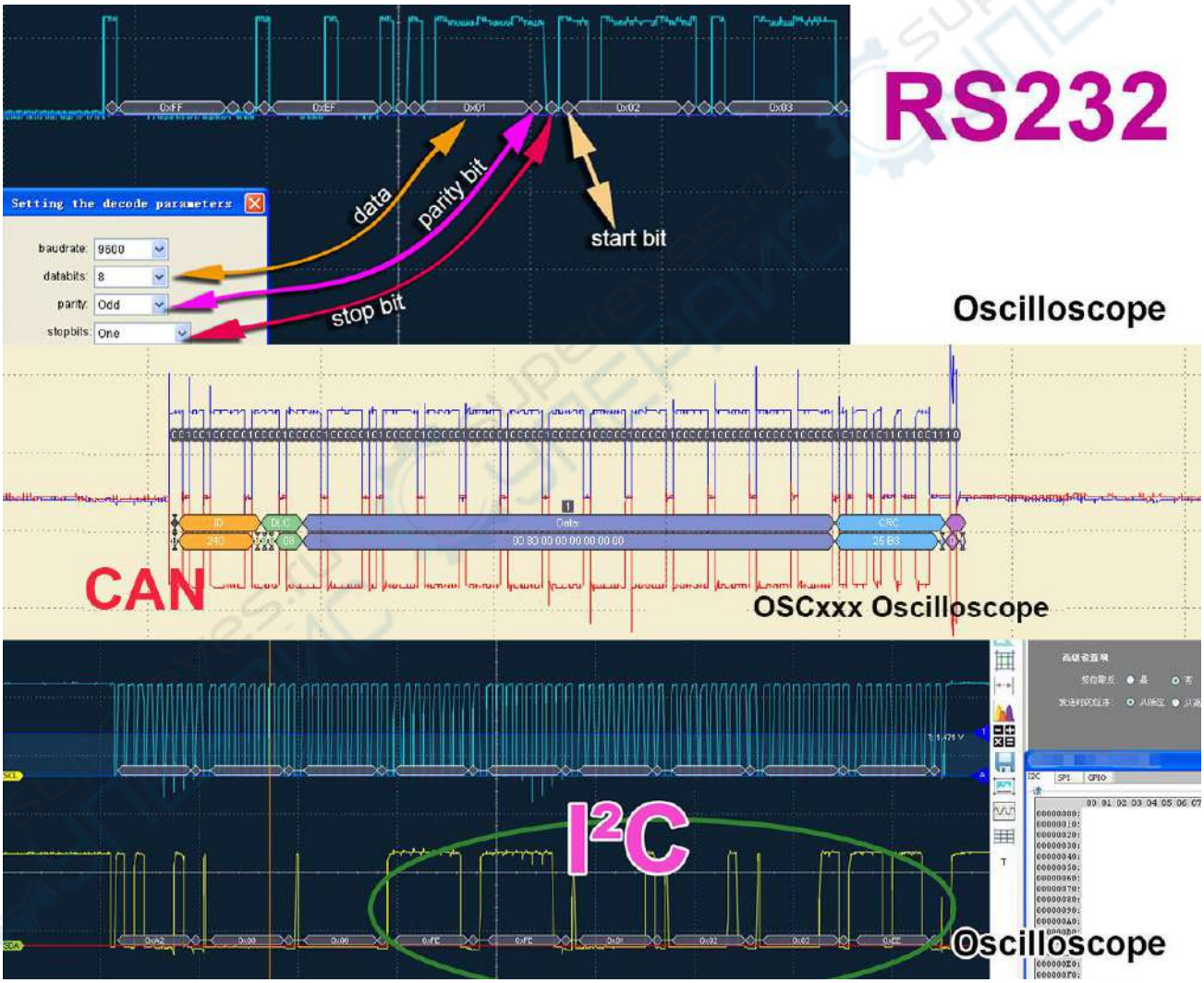
Windows Software

For the function of the PC software, please refer to the corresponding software manual, which will be described in detail. The following screenshots briefly show some of the features: Serial port decoding, X_Y drawing, carrier analysis, multi-point automatic measurement, logic analyzer, printing, FFT spectrum analysis, paperless recorder.

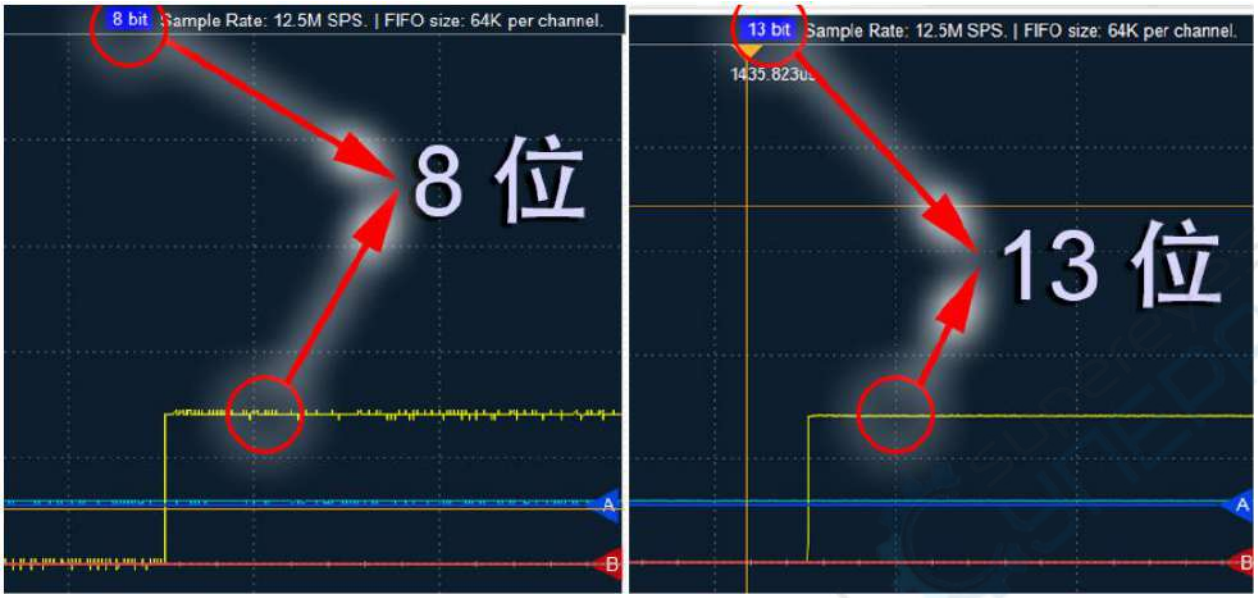




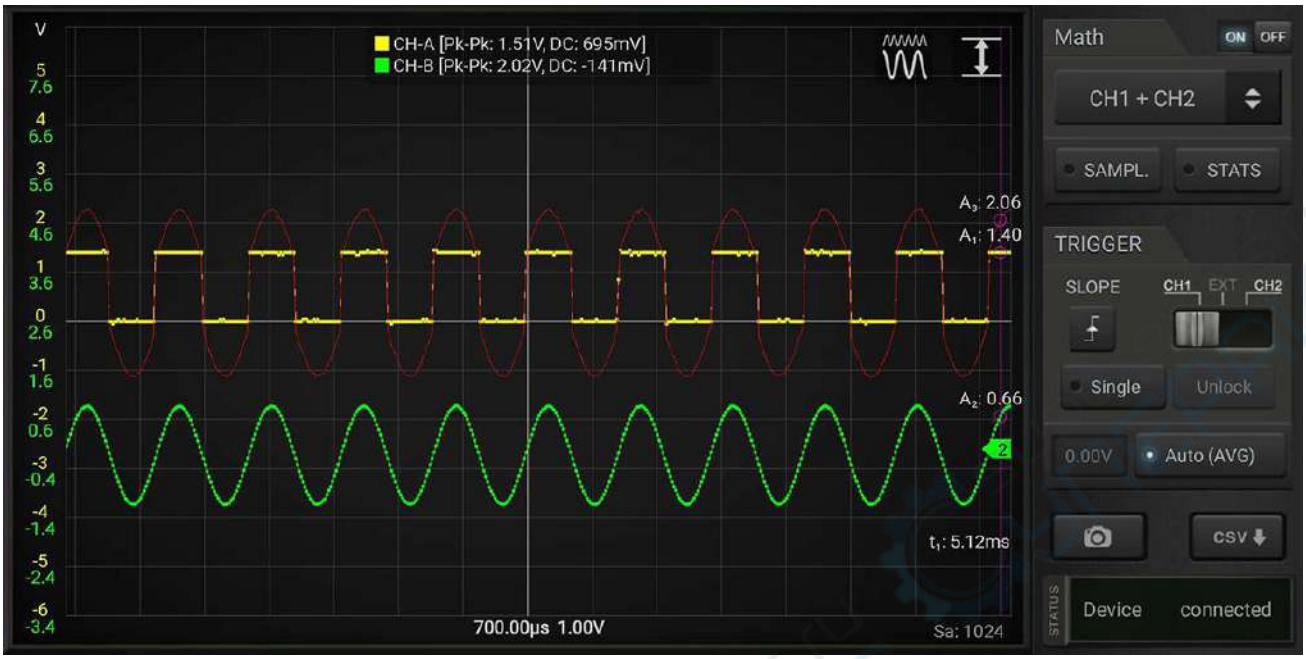
About the serial decoding function:



About 8~13 digits vertical resolution:



App for Android phone(OSC482M/OSC482F):



Note:
Although most Android phones/tablets are supported, it cannot be ruled out that individual models cannot be turned on due to the inability to enable OTG. We will maintain a list of tested phones and ask the supplier for the list before purchase.