Contents

Chapter 1:Safe Precautions

The following precautions described herein must be observed during the use of this instrument. If the instrument is used in a manner not specified in this manual, the protection provided by the instrument may be impaired. ZHIYUAN Electronics assumes no liability for the customer's failure to comply with these requirements.

1.1 General Precautions

In order to avoid injury to operators and damage to the instrument or the devices connected with the instrument, make sure to comply with the precautions below.

Use correct power cord

Only the dedicated power cord allowed by the country where the instrument is used can be used. Power cord specifications in mainland: $3\times0.75mm^2$, $\Phi6.3$，IEC 6022753，L=1100Mm. It is used with three-pin plug and has passed CCC certification.

Ground the instrument

The instrument must remain grounded through the protective grounding wire of its power cord. In order to avoid electric shock, make sure the power cord ground wire is properly connected with protective earth terminal before connecting any input and output terminal of the instrument.

Connect probe correctly

The probe's ground lead is at ground potential. Do not connect it to a high voltage.

Check all ratings before use the instrument

In order to avoid fire and high current impulse, please check all ratings and instructions of the instrument before use the instrument. For the detail information about all ratings, please refer to the related user manual.

Use appropriate over voltage protection

In order to avoid the electric shock to operators, make sure an over voltage (such as the voltage caused by thunderstorm) will not occur.

Do not operate the instrument when the chassis is open

Do not operate the instrument when the chassis is open.

Use the specified power fuse

If the power fuse is necessary to be changed, please return the instrument back to the factory.The power fuse complied with the specification of this product (Class T,rated current: 2A, rated voltage: 250V) will be replaced by the maintainer from ZHIYUAN Electronics.

Avoid exposed circuitry

When the instrument is switched on, do not touch the exposed connections and components.

Avoid electric shock

Power cord should be inserted into a socket with ground protection on the wall or within visible area. The socket cannot be used in the overcurrent situation.

When any fault occurs during the use of instrument

When there may be a fault during the use of instrument, please do not remove the screw of the handle to prevent scratching. If the product has any problem, please stop operating the instrument immediately and contact ZHIYUAN Electronics in time. ZHIYUAN Electronics will send engineers to inspect, maintain and adjust it or replace parts.

Keep instrument ventilated

Inadequate ventilation will cause instrument temperature increase, which may result in damage to the instrument. Please inspect vent and fan constantly to keep the instrument ventilated.

Do not use the instrument in a wet environment

In order to avoid the risk of short circuit and electric shock, do not operate the instrument in a wet environment.

Do not use the instrument in an explosive environment

In order to avoid instrument damage or personal injury, do not operate the instrument in an explosive environment.

Keep instrument surface clean and dry

To prevent dust or moisture in the air affecting instrument performance, please clean and dry the surface of instrument.

Electrostatic protection

Static electricity will cause damage to the instrument. The instrument should be tested in the anti-static area. The internal and external conductors of cables should be connected to ground to discharge the static electricity before they are connected to the instrument.

Transportation safety

To avoid damage to the parts (such as keys, knobs or interfaces on the panel) due to falling of instrument during transportation, please note transportation safety.

The way to use the handle

To ensure the safety of the oscilloscope during use and handling of the oscilloscope, please follow the method of using the handle.As shown below.

①

②

③

1.2 Warning signs and meanings

CAUTION ⚠️

CAUTIONsymbol indicates a hazard. Improper handling or execution in a specified process, operation and so on can lead to loss of important data or damage to the instrument. Please completely read and fully understand the related notes before continuing operation.

The following table lists signs that may be used by the instrument.

⚠️	Safety Warning	⏚	Probe Compensation Ground	⎍	Probe Compensation Input
⏻	Power ON/OFF	•⟨⟩	USBPort	40	40 years of use, recyclable
🗑	Do not throw the used battery into garbage bin.	CE	CE Certification		
⚠️ All inputs 1MΩ ~14pF 300VRMS CAT I .		Each channel has 1MΩ input resistor and 14pF input capacitor. All inputs are 300Vrms CAT I, i.e., their maximum voltage should not be greater than 300V RMS.			

(2) Measurement category introduction:

Measurement category includes CAT I, CATII, CATIII and CATIV. The main introduction is shown below.
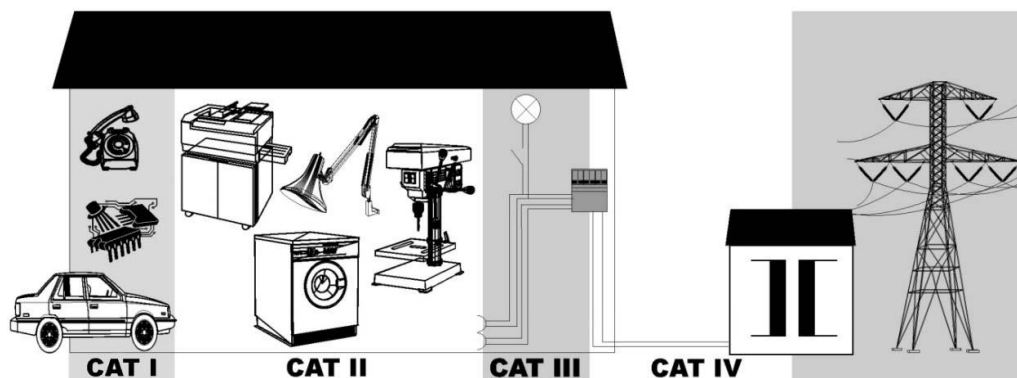
Measurement category	Measurement category display	Description	Note
I/O	CAT I	It is applicable to measure for the circuit not directly connected with main power supply	Measured for the circuit which is not supplied by main power supply or by main supply especially with internal protection.
II	CAT II	It is applicable to measure for circuits directly connected to the low-voltage device	Measured for household appliances, portable tools and other similar devices.
III	CAT III	It is applicable to measure for building facilities	Measured for the output socket, industrial device and other devices of the distribution board, circuit breaker and wirings include cable, busbar wire, junction box, switch and fixed facilities, such as those stationary motors permanently attached to fixed facilities.
IV	CAT IV	It is applicable to measure for the terminal of the low-voltage facilities	Measured for primary over current protection devices and ripple control units.

Notes: Note: The CAT I result is measured for the circuit not directly connected with main power supply. For example, a circuit is not supplied by main power supply or by main supply especially with internal protection. In the latter case, the transient stress is variable. Therefore, users should know the tolerant transient stress of device.

WARNING

WARNING symbol indicates serious danger. Improper handling or execution in a specified process, operation and so on can lead to serious or fatal injury to the users. Please completely read and fully understand the related notes before continuing operation.

1.3 Measurement Category

ZDS1000 series oscilloscopes can be measured in CAT I, and the maximum input voltage must be kept in the range of CAT I 300Vrms.

WARNING

The ZDS1000 Series oscilloscopes are only allowed to be used in the specified measurement category.

1.4 Instrument Placement

CAUTION

The instrument placement location should meet following conditions:

● Do not install the instrument in the place in direct sunlight, near heat sources, strong magnetic field sources, high voltage equipment or power lines, and where an excessive amount of soot, steam, dust or corrosive gas is present, and where there is water, oil or chemical.

● The instrument should be placed on a flat, even surface; otherwise the measurement precision may be impaired.

● Good ventilation. In order to ensure good ventilation inside the instrument, there are cooling holes in real panel to avoid high internal temperature; please make sure the air inlet and vent of the product keep the air flow freely. When using the oscilloscope on the work bench, please leave at least 10cm gaps on the top, back and both sides of instrument.

● Protection impairment if used in a manner not specified by the manufacturer.

● Not to position the equipment so that it is difficult to operate the disconnecting device.

Warning: Inadequate ventilation may cause temperature increase inside the instrument, thereby causing the damage to product. Please inspect vent and fan constantly to keep the instrument ventilated.

1.5 Maintenance and Cleaning

Maintenance

Do not place the instrument in a place exposed to direct sunlight for a long time.

Cleaning

Please clean the instrument as follows:

● Cut off power supply.
● Use a damp but not dripping soft cloth (with a mild detergent or water) to wipe the dust outside the instrument. When clean LCD screen, be careful not to scuff the transparent LCD protective screen.

WARNING

Before the product is powered on, make sure that the product is dry to avoid unnecessary accidents caused by leaving some moisture.

Chapter 2:Product Introduction

2.1 Main Features of 4-channelZDS1000 Oscilloscopes

- 70MHz 、100MHz bandwidth, 1GSa/s sampling rate.
- Equipped with 28Mpts mass memory depth.
- Equipped with 11 kinds of basic trigger, 21 kinds of protocol trigger and 21kinds of protocol decoding.
- Equipped with 50K wfm/s waveform refresh rate.
- 100Kpts FFT analysis function.
- 52 kinds of true parameters measurement and statistics. Through FPGA full hardware parallel processing, waveforms in full memory depth can be measured based on the original sampling point.
- 7-inch TFT color **touch** screen with 800×480 resolution. It has optimized 256 gray levels display.
- Support USB Host, USB Device, LAN and RS232 interface as well as SCPI, which provide rich communication interfaces for secondary programming control.

2.2 Panel Introduction

2.2.1 Front Panel/Rear Panel Description

ZDS1000 series oscilloscope with a touch screen can be operated by using full-screen touch, and it is easy to operate. Take the ZDS1104 digital oscilloscope as an example .The front panel of ZDS1104 digital oscilloscope is shown in Figure 2-1,including buttons/knobs and I/O interface, and their functions are described in Table 2-1.
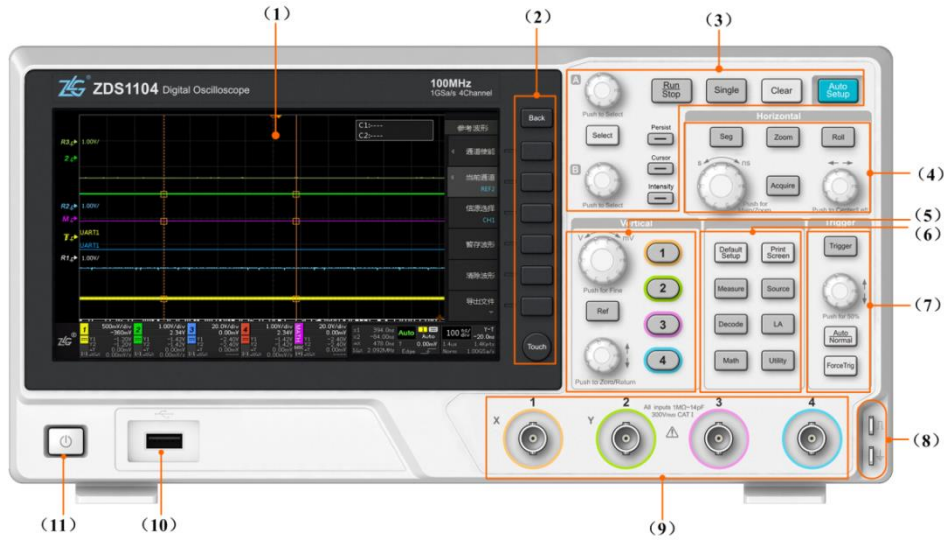
Figure 2-1: The front panel of ZDS1104 oscilloscope

Table 2-1: Front Panel Function Introduction

No.	Name	Description	Use Introduction
(1)	LCD	LCD with touch screen.	7-inch color display screen.
(2)	Menu function keys	These keys perform operations of the menus in the display.	Long press the soft keys to pop-up the explanation of the options in menu selection.
(3)	Run Control keys	These keys are used to start or stop data acquisition, set oscilloscope measurement automatically, and restore the oscilloscope's default settings.	Belongs to the key operation.
(4)	Horizontal control area	Mainly adjusts waveform level adjustment, combined with segmented storage, Zoom and reference wave forms	The knob can be adjusted clockwise or counterclockwise. The "large knob" adjusts the width of the waveform, the "small knob" adjusts the waveform horizontally, and the rest are key operations.
(5)	Vertical control area	This area is used to offset and zoom waveforms vertically.	The knobs can be turned clockwise or counterclockwise. The large knob can adjust the vertical sensitivity, and the small knob can adjust the vertical offset.
(6)	Multifunctional control area	The keys in this area are used to perform Decode, Digital, Math and Ref functions.	Belongs to the key operation.
(7)	Trigger control area	This area sets the triggering function.	The knobs can be turned clockwise or counterclockwise.

No.	Name	Description	Use Introduction
(8)	Probe compensation signal ground terminal	Ground terminal This terminal outputs a 1kHz, 3Vpp square wave signal.	Make the crocodile clip of the probe connected with ground terminal. It means the ground connection is successful.
(9)	Analog channel input terminal	These inputs are connected with analog signals to be measured. Note: The maximum input voltage is 150Vrms.	Connecting mode: Make the BNC female of the probe connected with the BNC terminal of the oscilloscope. Turn the knob to right, and these two interfaces stuck means the connection is successful.
(10)	USB host port	This port is for connecting USB storage devices.	Make the standard A type USB directly plugged into the USB host port for use.
(11)	Power switch	Press once to switch power on; press again to switch power off.	Key operation.

1.All soft keys are lighted up when the instrument is turned on, and the keys become gray when the instrument is not in used. 2.The LA (Digital Logic Analyzer) and Source (Signal Generator) functions in the front panel buttons are not yet open.

Figure 2-2 shows the real panel of ZDS1104 oscilloscope.
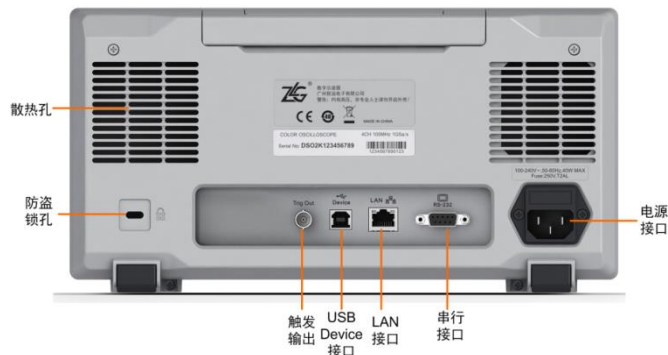
Figure 2-2: Real Panel of ZDS1104 Oscilloscope

Kensington lock: The oscilloscope can be locked on a fixed position by using Kensington lock as follows: insert the lock into the Kensington lock hole on the real panel, turn the key clockwise to lock the instrument, and then remove the key. Please note that do not insert any other things into the lock hole to prevent the instrument from damage.

Notes: Trigger output: Make the BNC female interface connected with the trigger output interface. Then turn the knob clock wise .These two interfaces stuck means the connection is successful.

Trigger input: Used to input an external trigger source. (Trigger level range: ±5V) Access mode: Connect the BNC female end of the external interface to the BNC end of the external trigger input, and rotate it to the right.

RS232 interface: This interface can be used for the serial port.

LAN interface: Make the network cable interface connected with the LAN interface.

USB Device: Make the standard B type USB serial cable connected with the USB Device interface for use.

AC power jack: Make the power line which is complied with the provision connected with the power interface. (See "General Precautions").

Chapter 3:Function Description

3.1 Search

The "search" function can quickly find the interested waveform signals and then mark them automatically for user to view these signals later conveniently. It provides many search conditions, including **edge, pulse width, rising/falling time, cycle, frequency, duty cycle, runt,** etc.

Click [Measure] to enter the measurement interface, select the search settings, and enter the search menu, as shown in Figure 3-1.

Figure 3-1: Waveform search/marking

3.2 Segmented storage funciton

The segmented storage is triggered several times in the process of acquisition, and the sampled data for each trigger are stored in the individual segment of storage space.

The total memory depth is divided into n segments, as shown in Figure 3-2. The first segment is used for display, and the second segment begins to be used for storage, that is, the sampled data is stored in the second segment when the first triggering occurs; after the second segment is full, the first triggering ends and users should wait for the arrival of the second triggering; and then the sampled data is stored into the third segment when the second triggering occurs; and so on.
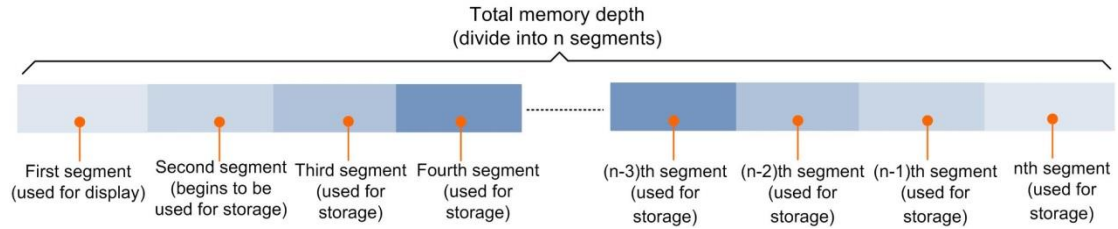
Figure 3-2: Segmented storage structure diagram

Take the ZDS1104 oscilloscope for example; its total memory depth is 28Mpts. The number of allocated segments is calculated as follows:

N=28 * 1024 * 1024 / (the current storage capacity is rounded to the nth power of 2) – 1.

3.3 Parameter measurement

The ZDS1000 Series oscilloscopes provide automatic measurement of parameters and statistical analysis of measurement results. Press the [Measure] button on the front panel to display the measurement menu as shown in Figure 3-3. After selecting the measurement item, the automatic measurement interface is shown in Figure 3-4.

Figure 3-3: Automatic measurement menu
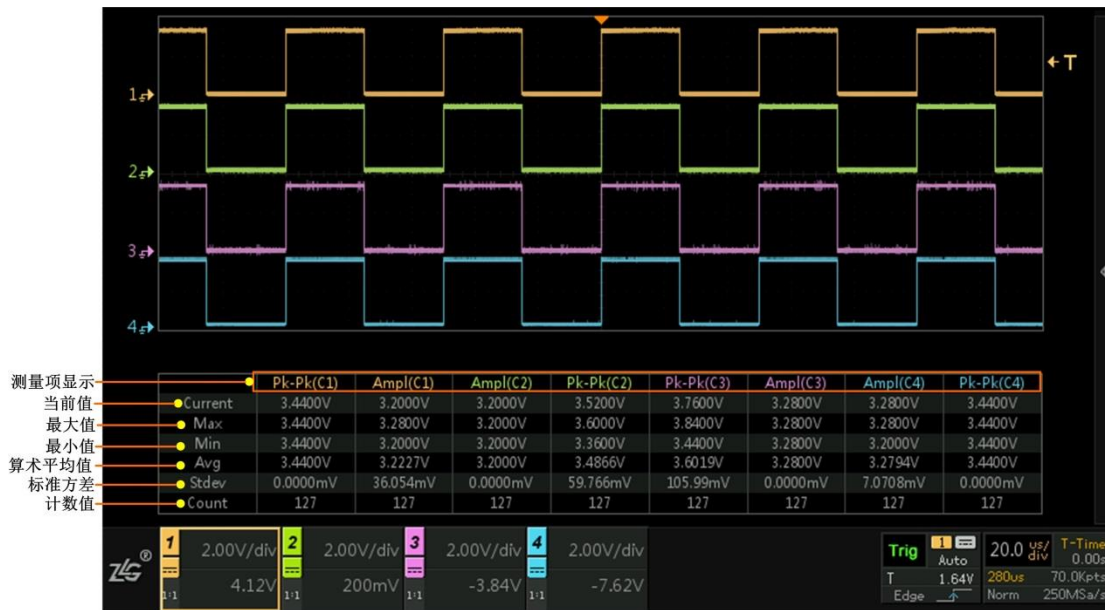
Figure 3-4：Automatic measurement interface

3.4 Cursor Measurement

Users can use the cursor measurement function to measure the X axis values (such as time) and Y axis values (such as voltage) of selected waveforms. There are two pairs of measurement cursors: X-type cursor or Y-type cursor. The X-type cursor is generally used to measure time parameters and Y-type cursor is generally used to measure voltage parameters, as shown in Figure 3-5.
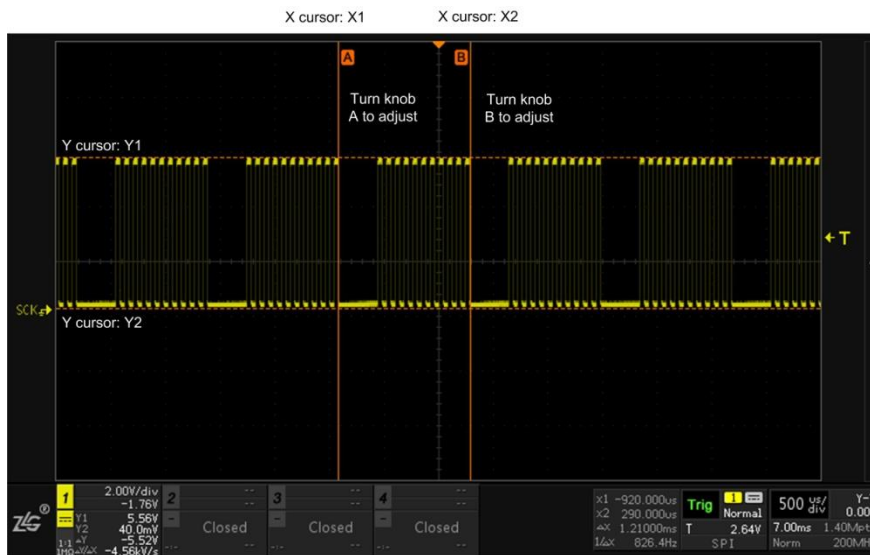
Figure 3-5: X-type cursor and Y-type cursor

3.5 FFT Function

Users can use FFT function to compute the Fast Fourier Transform. It is used to find crosstalk problems, locate distortion problems caused by the non-linearity of amplifier

in the analog waveform, or adjust the analog filter.
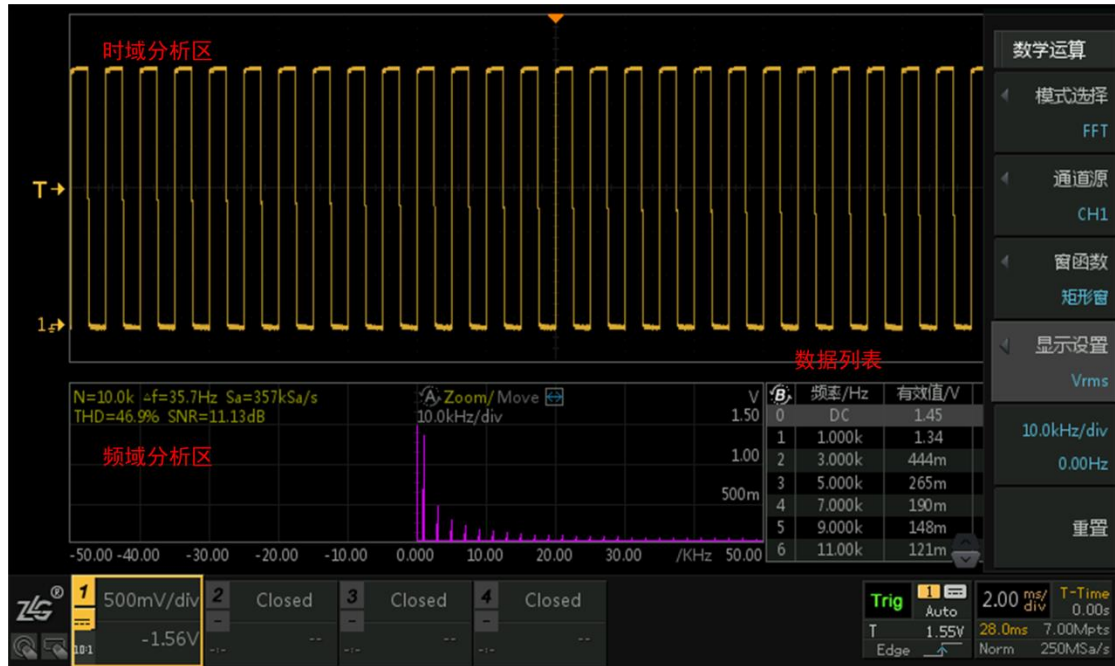
Figure 3-6: FFT interface view

3.6 Protocol Decoding

Users can easily find the communication error, debug hardware and accelerate the development progress through this function, as shown in Figure 3-7. ZDS1104 series oscilloscope can perform 21 protocols decoding for the input signals of 4 analog channels (CH1-CH2-CH3-CH4), including UART, SPI, I^{2}C, CAN-FD, CAN, Flex Ray, USB, Wiegand, LIN and other commonly used protocols.
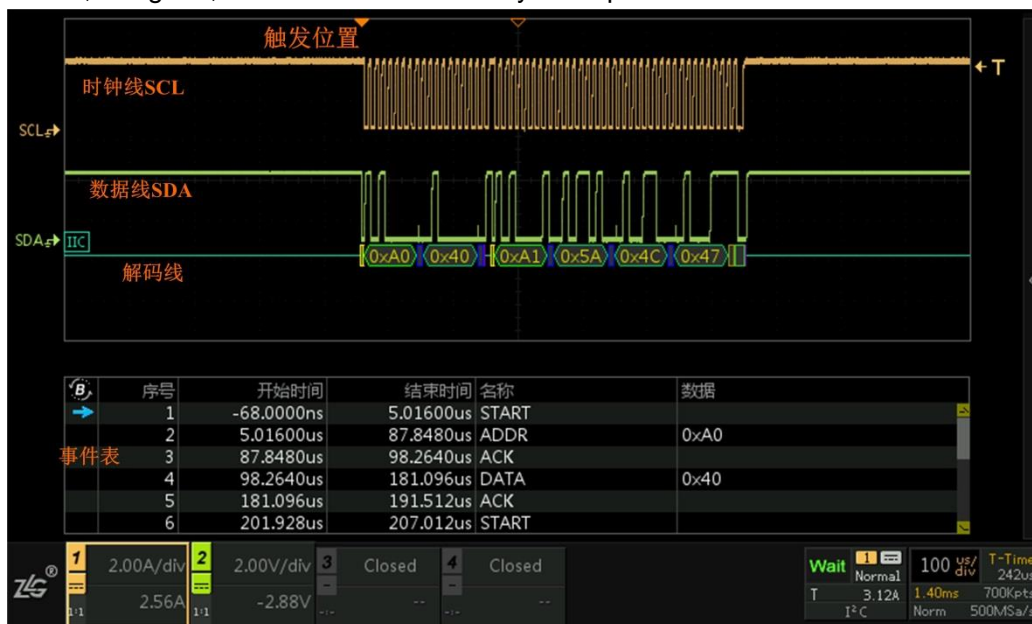
Figure 3-7: Decoding function view

Chapter 4:Technical Parameters for ZDS1000 Series Oscilloscope

All parameters can be guaranteed, but the oscilloscope must be operated continuously under the operating temperature for more than 30 minutes.

4.1 Vertical System

Figure 4-1: Theanalogchannelofvertical system

Characteristics	Description	
	ZDS1104	ZDS1074
Number of channels	4	4
Analog bandwidth (-3dB)	100MHz	70MHz
Calculated rising time	≤3.5ns	≤5 ns
Vertical resolution	8 bit	
Bandwidth limit	20MHz、OFF	
Input coupling	DC、AC、GND	
Input impedance	1MΩ ± 1% ‖ 16pF ±3pF	
Input sensitivity range	1mV/div ～ 10V/div，1-2-5stepping	
Maximum Input Voltage （1MΩ）	CAT I 300Vrms	
DC Gain accuracy	1 mV/div ~5 mV/div ： ±4% full scale 10 mV/div ~ 10 V/div： ±3% full scale	
DC Offset accuracy	±0.1 div±2 mV ±2% offset value	
Interchannel isolation	>40dB	
Low-frequency response (AC coupling，-3dB)	≤5Hz	
Offset range	1mV/div~ 200mV/div：±2V 500mV/div ~ 10V/div：±40V	
Dynamic range	Screen center ±6div	
Probe attenuation coefficient	0.1×~1000×，1-2-5 stepping	

4.2 Horizontal System

Figure 4-2: The analog channel of horizontal system

Characteristics	ZDS1000 Series Models
Time range	5ns/div ～ 1Ks/div，1-2-5 步进
Time base accuracy	10ppm ± 5ppm/year (ageing)
Waveform refresh rate	50,000wfms/s[Note];
Delay range	Pretrigger：≤Memory depth; post trigger：40ms – 2000s
Time base mode	Y-T、X-Y、ROLL

4.3 Sampling System

Figure 4-3: Acquisition mode

Mode	Description		
Sampling mode	**Real-time sampling**		
Maximum sampling rate	1GSa/s(single channel);500MSa/s(Multiple channels); 250MSa/s(Four channels);		
Memory depth	**Single channel**： 1.4Kpts、14Kpts、140Kpts、700Kpts、1.4Mpts、7Mpts、14Mpts、**28Mpts** **Multiple channels**：**fixed depth**, 1.4Kpts、14Kpts、140Kpts、700Kpts、1.4Mpts、7Mpts、**14Mpts** **Four channels:** **fixed depth**, 1.4Kpts、14Kpts、140Kpts、700Kpts、1.4Mpts、**7Mpts**		
Peak detection	The sampling spikes of all scan rates are narrowed to 4ns.		
Average	Includes 2 to 65536 waveforms averagely.		
High resolution	Reduces random noise and increases vertical resolution in real time averagely.		
	single channel	**Multiple channel**	**Four channels**
	9bit：Sampling rate≤250MSa/s 10bit：Sampling rate ≤62.5MSa/s 11bit：Sampling rate≤12.5MSa/s 12bit：Sampling rate≤2.5MSa/s	9bit：Sampling rate ≤125MSa/s 10bit：Sampling rate ≤25MSa/s 11bit：Sampling rate≤5MSa/s 12bit：Sampling rate≤1MSa/s	9bit：Sampling rate ≤62.5MSa/s 10bit：Sampling rate ≤12.5MSa/s 11bit：Sampling rate≤2.5MSa/s 12bit：Sampling rate≤0.5MSa/s
Scroll	Scrolls the waveform from right to left on the screen, and the time base range is greater than or equal to 50ms/div.		

4.4 Trigger System

Figure 4-4: Trigger system

Characteristics	Description
Trigger Source	CH1、CH2、CH3、CH4、外触发、市电触发
Trigger mode	Automatic,normal
Trigger coupling	DC, AC, high frequency rejection (50KHz), low frequency rejection (50KHz)
Trigger hold-off range	8ns ~ 34s
Trigger sensitivity	Internal：0～1div, external：300mV
Trigger level	Internal：±5div from the center of the screen，external：±5V

4.5 Trigger Type

Figure 4-5: Trigger type

Model	Trigger Type	
	Basic Trigger	**Protocol Trigger**
ZDS1104 ZDS1074	Edge, Pulse, Runt, Setup/Hold, Delay, Nth-Edge, Pattern, Time-out, Pos-Runt, Slope, Video	UART, I2C, SPI, CAN, CAN FD, USB, LIN,SD_SPI,SD_SD,Wiegand,FlexRay,DS18B20 ,PS/2,DALI,HDQ,1-Wire,IrDA,Manchester, DHT11,SHT11

Figure 4-6: Basic trigger type description

Trigger Type Symbol	Description
Edge trigger	Includes rising edge trigger, falling edge trigger and rising/falling edge trigger. The edge will be triggered when reaches the trigger level.
Pulse trigger	The positive pulse or negative pulse is triggered at the specified pulse width time.
Slope trigger	Triggered when the pulse edge rate is faster/slower than the specified value.
Video trigger	Trigger on the specified line, random line, even field, odd field or random field of NTSC, PAL and SECAM video signals.
Runt trigger	Trigger when the pulse amplitude is greater than or less than the set value.
Pos-Runt trigger	Trigger when the pulse amplitude is greater than the normal amplitude.
Pattern trigger	The pattern types of two channels are high level, low level, ignore, rising edge and falling edge. The waveforms which meet the conditions will be triggered after setting.
Nth-Edge trigger	The signal is triggered at the Nth edge after idle.
Delay trigger	Triggered when the time difference between the specified edge of source A and the specified edge of source B satisfies the set delay time.
Time-out trigger	Triggered when the level duration is greater than the specified time value.
Setup/Hold trigger	Triggered when the time of data setup or hold is satisfied.

4.6 Decoding Type

Figure 4-7: Protocol decoding type

Model	Protocol Type	Protocol Name
ZDS2022B Plus ZDS2024B Plus	Automotive Electronics	CAN, LIN(LIN1.3, LIN2.0), Flex Ray, CAN-FD
	IC interfaces	1-WIRE, I2C, SPI, UART
	Computer peripherals	USB1.1, PS/2
	Wireless communication	Manchester, Diff Manchester, WIEGAND, Miller
	Photo electricity	DALI
	Sensor	DS18B20, SHT11, DHT11
	Power management	HDQ
	Storage	SD-SPI, SD-SD

Figure 4-8: Decoding protocols information

Characteristics	Description
UART	There are 2-channel signals in UART protocol: TXD and RXD.UART (RS-232/422/485/UART) bus within the 10Mb/s can be triggered and decoded on the oscilloscope.
I2C	I2C protocol has 2-channel signals: SCL (clock line) and SDA (data line).I2C bus within 20Mb/s can be triggered and decoded on the oscilloscope.
SPI	SPI has SCK (clock line)and MOSI/MISO (data line), and there is no chip select line should be connected. SPI bus can be triggered and decoded within 20Mb/s.
CAN	CAN protocol has three data types: CANH, CANL and CAN-DIFF. The start bit or all kinds of data frame trigger modes can be configured.
CAN-FD	CAN-FD protocol has three data types: CANH, CANL and CAN-DIFF .The normal Baud rate and FD Baud rate should be set and the start bit triggering and all kinds of data frame triggering can be configured.
LIN	LIN protocol support LIN1.1 and LIN1.3 version, LIN bus synchronization interval, synchronous field, specific ID, specific ID + specific data within the 1Mb/s can be triggered.
Flex Ray	Flex Ray has one data line TXD .Flex Ray bus within 20Mb/s can be triggered in the TSS and frame ID.
USB	USB has two sources, including D+ and D-. USB2.0 (low speed +full speed) bus output packet, input packet, start packet,

	setup packet, DATA0, DATA1, response packet, no response packet, stop packet, preamble packet ,package synchronization and package terminator within 20Mb/s can be triggered. Each triggering mode can further specify the specific information of the corresponding packet, for example, the start packet to set the expansion parameters and account values, the setup package to set the expansion parameters, address values and port values.
SD_SPI	SD_SPI has two sources, including clock source and command source. On the 20Mb/s SD bus (SPI mode), the specific command or specific command + parameter can be triggered and decoded.
SD_SD	On the 20Mb/s SD bus (SD mode), the specific command or specific command + parameter can be triggered.
Wiegand	Triggers when the specified OEM, FC, CC segmen ten countered on the Wiegand bus(26Bit, 39Bit, 44Bit or customized frame format), or data is the specified value. Supports for masking certain fields as needed.
DS18B20	DS18B20 has one data channel. The temperature resolution of 9,10,11,12bitscan be set for decoding .The start bit, the specified ROM command and the specified RAM command on the DS18B20 bus can be triggered.
PS/2	PS/2 has two sources, including clock source and data source. The start bit and data on the PS/2 bus within 1Mb/s can be triggered, which support triggering from the host to slave and from the slave to host.
DALI	DALI has one data source. Triggers for decoding when the specified Forward19, Forward27, Backward frame en countered on the DALI bus.
HDQ	HDQ has one data source. The data length of 8-bit or 16-bit can be set for decoding. The reset segment and the specified command are triggered on the HDQ bus.
1-Wire	1-Wire has one data source. Its speed mode can be set to standard or drive for decoding. The start bit and the specified ROM command are triggered on the 1-Wire bus (low-speed, high-speed mode).
Miller	Miller has one data source Its Baud rate can be set for decoding, and the data transfer mode can be specified on the Miller bus for data triggering.
Manchester	Manchester has one data source .The encoding mode can select G.E or IEEE for decoding. The start bit of the specified package is triggered on the Manchester bus.
Diff-Manche	Diff-Manche has one data source. The encoding mode can select G.E or IEEE for decoding. The start bit of the specified package is triggered on differential Manchester bus.

DHT11	DHT11 has one data source .The start bit is triggered on the DHT11 bus.
SHT11	SHT11 has one data source. The specified command is triggered on the SHT11 bus.

4.7 Measurement Parameters

Table 4-9: Measurement Parameters

Characteristics	Description	
Cursor measurement	Display X1, X2, △X, 1/△X, Y1, Y2, △Y, 1/△Y at the same time	
Parameter measurement (52kinds)	Voltage parameters (19 kinds)	Peak to peak, amplitude, maximum, minimum, top value, bottom value, positive overshoot, negative overshoot, positive pre shoot, negative pre shoot, average value-cycle ,average value-full screen, DC RMS - cycle ,DC RMS - full screen, AC RMS - cycle ,AC RMS - full screen, ratio - cycle, ratio - full screen, mean value
	Time parameters (22kinds)	Cycle, frequency, rising time, falling time, positive pulse width, negative pulse width, positive duty cycle, negative duty cycle, burst width, string pulse length, X@ min, X@ max, delay 1↑→2↑, delay 1↓→2↓, delay 1↑→2↓, delay 1↓→2↑, phase 1↑→2↑, phase 1↓→2↓, Setup time, hold time, setup-hold ratio, baud rate
	Count (5 kinds)	Rising edge count, falling edge count, positive pulse count, negative pulse count, trigger counter
	others (6 kinds)	Area - cycle, area – full screen, positive area - cycle, negative area - cycle, positive area - full screen ,negative area – full screen
Number of measurements	Display 8 kinds of measurement items at the same time	
Measurement Statistics	Current value, maximum, minimum, average value, standard deviation, statistic times	
Hardware frequency meter	Supported. The maximum frequency is the oscilloscope bandwidth.	

4.8 Waveform Mathematic Operation

Table 4-10: Waveform Mathematic Operation

Characteristics	Description
Waveform operation	**Basic operation :**A+B, A-B, A×B, A/B, integral, differential、$\int (A*B)\,dt$;
FFT	Fast Fourier transform
Number of FFT	Run:10Kpts,Stop:100Kpts

sample points	
FFT display mode	dBm、Vrms、Ampl、PSD
FFT window type	Rectangle、Hamming、Hanning、Blackman-Harris

4.9 Display Characteristics

Table 4-11: Display Characteristics

Characteristics	Description
Display type	7.0-inch TFT touch screen
Display resolution	800 (horizontal) × 480 (vertical)
Waveform type	Point, vector
Display mode	Normal, persistence, color temperature
Persistence length	100ms, 200ms, 500ms, 1s, 2s, 5s, 10s, 20s, 50s, infinite
Scale	14div（horizontal）× 8div（vertical）

4.10 Input/output Port

Table 4-12: Input/output Port

Port Type	Description
USB HOST	Connect U disk
USB DEVICE	Connect PC
LAN	RJ-45 connector，support 10/100BASE-T
RS232	RS232 communication port
Trig Out	The BNC connector on the rear panel provides pulse output when the oscilloscope is triggered.
Probe compensation output	Front panel pins; amplitude: 3.0V, frequency: 1KHz

4.11 Technical Specifications

Table 4-13: Technical Specifications

Power Supply	Description
Supply voltage	100—240V~
Supply frequency	50 — 60 Hz
Power	40W max
Fuse	2A, Class T, 220V
Mechanical Specifications	**Description**
Dimensions	Width*height*depth =$309mm \times 160mm \times 118mm$
Weight	Net weight: 2.4Kg; gross weight: 3.5Kg
Environment	**Description**

Temperature range	Operation：10℃~+40℃, Storage：-20℃~+70℃
Ingress Protection Rating	IP20
Humidity range	≤60％ relative humidity
Cooling method	Fan
Altitude	Less than 2000m (operating), less than 12000m (non-operating)
Electromagnetic Compatibility	2014/30/EU, EN61326-1:2013
Safety	IEC/EN 61010-1:2010、GB4793.1-2007、IEC/EN 61010-2-030:2010、EN 61010-031, 2nd

4.12 Accessories

Table 4- and Table 4- list the accessories of ZDS1000 series oscilloscope.

Table 4-14: Standard Accessories

Accessory Name	Description
Probe	Standard configuration ofa passive probe (X1 and X10 range) for each channel.
Power line	For the power supply of an oscilloscope
Information disk	Product e-information
Warranty Card	To apply for product warranty service

Notes: *ZLG ZHIYUAN Electronics assumes no responsibility for the risk due to use of the probe from other companies.*

Table 4-15: Optional Accessories

Accessory Name	Description
Current probe	For current signals measurement
High voltage differential probe	For high voltage and floating voltage measurement
Terminal	50Ω matching resistance

Chapter 5:Rights& Statements

This document is owned by Guangzhou ZHIYUAN Electronics Co., Ltd. Any claims, demands or loss from third-party, including reasonable attorneys' fee, arising from any individual or unit unauthorized commercial use of this document without prior consent of ZHIYUAN Electronics, is all borne by the individual or unit themselves. ZHIYUAN Electronics and partner companies, affiliates do not assume any liability.

Note, in order to protect the autonomy of business development and adjustment, Guangzhou ZHIYUAN Electronic Co., Ltd. reserves the right to modify this manual at any time without notice to the user. If necessary, the changes will be announced by notice published on the important page of company website.