Service Manual

SDS1000D Digital Storage Oscilloscope

June 2011

SIGLENT Technologies Co., Ltd.

Declaration

General Safety Summary

Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it. To avoid potential hazards, use this product only as specified. Only qualified personnel should perform service procedures.

1. To Avoid Fire or Personal Injury

- **Use Proper Power Cord**. Use only the power cord specified for this product and certified for the country of use.
- **Connect and Disconnect Properly**. Do not connect or disconnect probes or test leads while they are connected to a voltage source.
- **Ground the Product**. This product is grounded through the grounding conductor of the power cord. To avoid electric shock, the grounding conductor must be connected to earth ground. Before making connections to the input or output terminals of the product, ensure that the product is properly grounded.
- **Connect the Probe Properly**. The probe ground lead is at ground potential. Do not connect the ground lead to an elevated voltage.
- **Observe All Terminal Ratings**. To avoid fire or shock hazard, observe all ratings and marking on the product. Consult the product manual for further ratings information before making connections to the product.
- **Do Not Operate Without Covers**. Do not operate this product without covers or panels removed.
- **Use Proper Fuse**. Use only the fuse type and rating specified for this product.

- **Avoid Exposed Circuitry**. Do not touch exposed connections and components when power is present.
- **Do Not Operate With Suspected Failures**. If you suspect there is damage to this product, have it inspected by qualified service personnel.
- **Do Not Operate in Wet/Damp Conditions.**
- **Do Not Operate in an Explosive Atmosphere.**
- **Keep Product Surfaces Clean and Dry.**

Power Line Conducted Emission Limits (Class B)

Measuring standard: EN61326:1998+A1, 2002+A2, 2003

2. Safety Terms and Symbols

Terms used on the Product. These terms may appear on the product:

DANGER: Indicates an injury hazard immediately accessible as you read the marking.

WARNING: Indicates an injury hazard not immediately accessible as you read the marking.

CAUTION: Indicates a hazard to property including the product.

Symbols used on the Product. These symbols may appear on the product:

Document Summarize

Chapter 1 Specifications

List the specifications and general specifications of SDS1000D series digital oscilloscope.

Chapter 2 Prepare for Use

Introduce the preparatory work should be done before using the oscilloscope.

Chapter 3 Performance Test

Introduce how to execute the performance test to understand current performance status of the oscilloscope.

Chapter 4 Calibration

Introduce how to calibrate the oscilloscope.

Chapter 5 Disassembly and Assembly

Introduce how to disassemble and assemble the oscilloscope to understand its structure.

Chapter 6 Trouble

List the troubles may appear during measuring and the solutions.

Chapter 7 Replaceable Parts

List the replaceable parts for user’s repair or exchange.

Catalogue

Chapter 1 Specifications

All specifications apply to 10X probe and SDS1000D Digital Storage Oscilloscopes. To verify that the oscilloscope meets specifications, the oscilloscope must first meet the following conditions:

- The oscilloscope must have been operating continuously for thirty minutes within the specified operating temperature.
- You must perform the Do Self Cal operation, accessible through the Utility menu, if the operating temperature changes by more than 5° C.
- The oscilloscope must be within the factory calibration interval①.

All specifications are guaranteed unless noted “typical”.

Specifications

Inputs	
Input Coupling	AC, DC, GND
Input Impedance	1MΩ±2% ‖ 16Pf±3Pf
Maximum input voltage	400V （DC+AC PK-PK，1MΩ input impedance），CAT I,CAT II
Probe attenuator	1X、10X
Probe attenuator Factors Set	1X、5X、10X、50X、100X、500X、1000X

Vertical System	
Vertical Sensitivity	2mV/div - 10V/div(1-2-5 order)
Channel voltage offset range	2mV-200mV：±800mV 206mV-10V：±40V
Vertical Resolution	8 bit
Channels	2
Analog Bandwidth	200MHz(SDS1202D) 150MHz(SDS1152D)

	100MHz (SDS1102D) 60MHz (SDS1062D) 40MHz (SDS1042D) 25MHz (SDS1022D)
Single-shot Bandwidth	200MHz (SDS1202D) 150MHz (SDS1152D) 100MHz (SDS1102D) 60MHz (SDS1062D) 40MHz (SDS1042D) 25MHz (SDS1022D)
Lower frequency limit (AC -3dB)	≤10Hz(at input BNC)
DC Gain Accuracy	＜±3.0%: 5mv/div to 10V/div in Fixed Gain Ranges ＜±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]
DC Measurement Accuracy: All Gain settings＞ 100mv/div	±[3%X（reading+offset）1% of offset +0.2div+100mv]
Rise time	<1.7ns （SDS1202D） <2.3ns （SDS1152D） <3.5ns （SDS1102D） <5.8ns （SDS1062D） <8.8ns （SDS1042D） <14ns （SDS1022D）
Vertical input coupling	AC, DC, GND
Math operation	+, -, *, /, FFT
FFT	Window mode: Hanning, Hamming, Blackman, Rectangular
	Sampling points: 1024
Bandwidth limited	20MHz (-3dB)(SDS1022D doesn’t have this function)

Horizontal System	
Real Time Sampling Rate	Single Channel:500MSa/s,Double Channel: 250MSa/s
Equivalent Sampling Rate	50GSa/s
Measure Display	MAIN, WINDOW, WINDOW ZOOM, ROLL, X-Y

Modes	
Time base Accuracy	±50ppm measured over 1ms interval
Horizontal Scan Range	2.5nS/DIV - 50S/DIV
	Roll: 100mS/DIV ～50S/DIV (1-2.5-5 order)

Measure System	
Auto Measure (32 Types)	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

Trigger System	
Trigger Types	Edge, Pulse Width, Video, Slope, Alternative
Trigger Source	CH1、CH2、EXT、EXT/5、AC Line
Trigger Modes	Auto, Normal, Single
Trigger Coupling	AC, DC, LF rej, HF rej
Trigger Level Range	CH1,CH2: ±6divisions from center of screen
	EXT: ±1.2V
	EXT/5: ±6V
Trigger Displacement	Pre-trigger：（Memory depth/（2*sampling））, Delay Trigger: 260DIV
Holdoff range	100ns – 1.5s
Edge Trigger	Edge type: Rising, Falling, Rising and Falling
Pulse Width Trigger	Trigger Modes: (＞, ＜, ＝)Positive Pulse Width, (＞, ＜, ＝)Negative Pulse Width
	Pulse Width Range: 20ns – 10s
Video Trigger	Support signal Formats: PAL/SECAM, NTSC
	Trigger condition : odd field, even field, all lines, line Num
Slope Trigger	(＞,＜, ＝) Positive slope, (＞,＜, ＝) Negative slope
	Time: 20ns-10s
Alternative Trigger	CH1 trigger type: Edge, Pulse, Video, Slope
	CH2 trigger type: Edge, Pulse, Video, Slope

X-Y Mode	
X-pole Input / Y-Pole Input	Channel 1 (CH1) / Channel 2 (CH2)
Phase Error	±3 degrees
Sample Frequency	XY mode has a breakthrough that trade oscilloscopes restrict sampling rate at 1MSa/s and supports 5KSa/s～200MSa/s ,(1-2.5-5 order)

Hard Ware Frequency Counter	
Reading resolution	6 Bytes
Range	DC Couple, 10Hz to MAX Bandwidth
Signal Types	Satisfying all Trigger signals(Except Pulse width trigger and Video Trigger)

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.

Generic Specifications

Display System	
Display Mode	Color TFT 5.7in.(145mm)diagonal Liquid Crystal Display
Resolution	320 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 12 div
Wave Display Mode	Point, Vector
Persist	Off, 1 sec, 2 sec, 5 sec, Infinite
Menu Display	2 sec, 5 sec, 10 sec, 20 sec, Infinite
Screen-Saver	Off,1min,2min,5min,10min,15min,30min,1hour,2hour,5hour
Skin	Classical, Modern, Tradition, Succinct
waveform interpolation	Sin(x)/x
Color model	Normal , Invert
Language	Simplified Chinese, Traditional Chinese, English, Arabic, French, German, Russian, Spanish, Portuguese Japanese, Korean, Italian

Environments	
Temperature	Operating:10℃ to +40℃ Not operating: -20℃ to +60℃
Cooling	The fan forces it cold.
Humidity	Operating: 85%RH, 40℃, 24 hours Not operating: 85%RH, 65℃, 24 hours
Height	Operating: 3000m 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	305mm
	Width	133mm
	Height	154mm
Weight	2.3 kg	

Chapter 2 Prepare for Use

This chapter includes the following contents:

- General Inspecting
- Power-On Inspecting
- Connect the Probe
- Probe Compensation
- Auto Setting

General Inspecting

After receiving a new SDS1000D series oscilloscope, please inspect the instrument as follows:

1. **Inspect the shipping container for damage.**

   Keep the damaged shipping container or cushioning material until the contents of the shipment have been checked for completeness and the instrument has been checked mechanically and electrically.

2. **Inspect the whole instrument.**

   In case there is any mechanical damage or defect, or the instrument does not operate properly or fails performance tests, notify the **SIGLENT** Sales Representative.

   If the shipping container is damaged, or the cushioning materials show signs of stress, notify the carrier as well as the **SIGLENT** Sales Department. Keep the shipping materials for carrier's inspection.

3. **Check the accessories.**

   Accessories supplied with the instrument are listed below. If the contents are incomplete or damaged, notify the **SIGLENT** Sales Representative.

   Standard Accessories:

   - Two pieces 1:1,(10:1) Passive Probes
   - An User Manual
   - A Certification
   - A Guaranty Card
   - An CD(including EasyScope3.0 computer software system)
   - A Power Cord that fits the standard of destination country
   - An USB Cable

Power-On Inspection

Normal operating voltage for DS1000CA series digital oscilloscope is the range of 100-240VRMS with the frequency from 45Hz to 440Hz. Connect one terminal of the power cord to the socket in left side of the oscilloscope and the other to the power source.

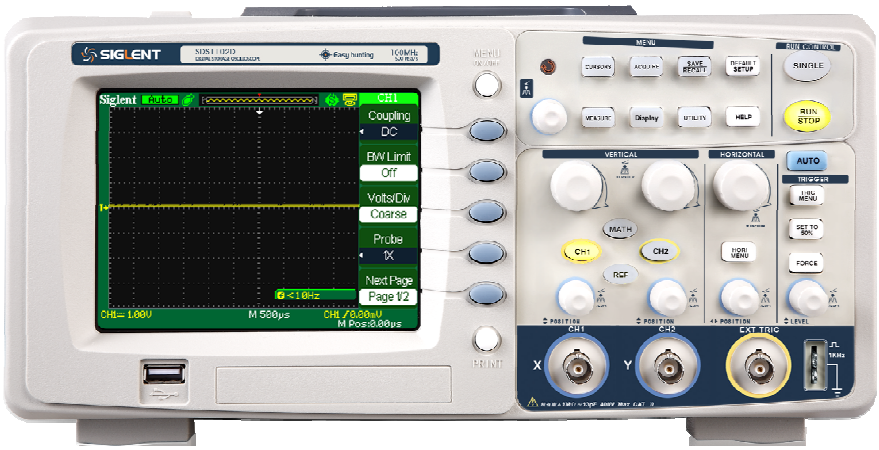
Picture 2-1 Connect power line

Press the button on top of oscilloscope, some keys on the front panel will be lighted for about 6 seconds until the normal display appears. And then you can operate the oscilloscope.

WARNING

To avoid the electric shock, make sure the oscilloscope is under good grounding before connecting AC power.

After power-on, the oscilloscope performs the self test automatically. After the test, press the "DEFAULT/SETUP" button, then recall the Factory settings.

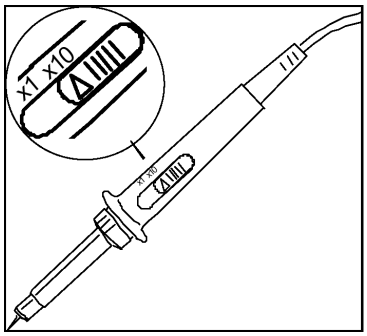


Picture 2-2 Power-On Inspecting

Probe Compensation

You are suggested to compensate probe before first using so as to match it to the input channel. Measurement error may generate without the compensation or because of deviation compensation. To compensate the probe, follow the steps below.

1. Set the probe option attenuation in the channel menu to 10X. Set the switch to 10X on the probe.

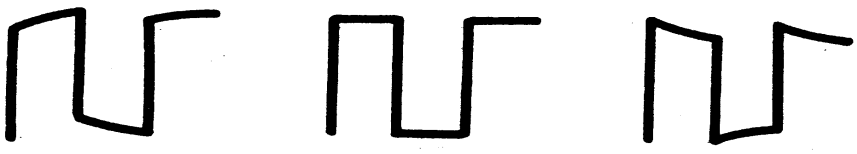


Picture 2-3 Set the attenuation switch and probe scale

2. Connect the probe to channel 1 on the oscilloscope, and attach the probe tip to the PROBE COMP

Picture 2-4 Connect PROBE COMP

3. Press AUTO. Within a few seconds, a square wave will be displayed (1 kHz, approximately 3 V pk-pk). Check if the compensation is correct according to the shape of waveform.



Under compensated Compensated correctly Over compensated

Picture 2-5 Check the shape

4. If necessary, adjust your probe. Repeat as necessary.

Auto Setup

SDS1000D Series Digital Storage Oscilloscopes have auto setup function, which can identify the type of waveform and adjust controls to produce a usable display of the input signal.

AUTO is the auto setup button.

Table2-1 Auto setup function menu:

Option	Introduction
 （Multi-cycle sine）	Auto set the screen and display several cycle signal.
 （Single-cycle sine）	Set the screen and auto display single cycle signal.
 （Rising edge）	Auto set and show the rising time.
 （Falling edge）	Auto set and show the falling time.
 （Undo Setup）	Causes the oscilloscope to recall the previous setup.

There are four measure parameter will be displayed in the screen. Auto set determines the trigger source based on the following conditions:

- If multiple channels have signals, channel with the lowest frequency signal.
- The input frequency must be higher than 10Hz, and the amplitude must be higher than 8MV

Table 2-2 Auto setup function item

Function	Setting
Acquire Mode	Adjusted to Sampling
Display Format	Y-T
Display Type	Set to Dots for a video signal, set to Vectors for an FFT spectrum; otherwise, unchanged
Vertical Coupling	Adjusted to DC or AC according to the input signal

Bandwidth Limit	Off(full)
V/div	Adjusted
VOLTS/DIV adjustability	Coarse
Signal inverted	Off
Horizontal position	Center
S/div	Adjusted
Trigger type	Edge
Trigger source	Auto detect the channel which has the input signal
Trigger slope	Rising
Trigger mode	Auto

Chapter 3 Performance Test

This chapter includes the following contents:

- Interface Test
  USB Host
  USB Device
  RS-232
  Pass/Fail

- Specification Test

Interface Test

USB Host Test

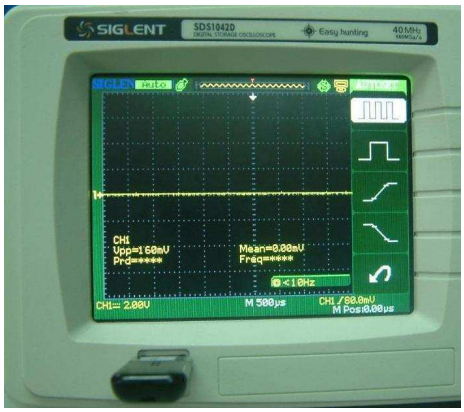
Purpose: Test if the USB Host interface works normally through U disc.

Tools：

- An Unit SDS1000D digital oscilloscope
- An U disc

Steps：

1．Insert a U disc into the interface of USB Host on the front panel of the oscilloscope.



Picture 3-1 Connect the U disc

2．Wait until a prompt message “USB Flash Drive Plug In!” appeared on the screen.

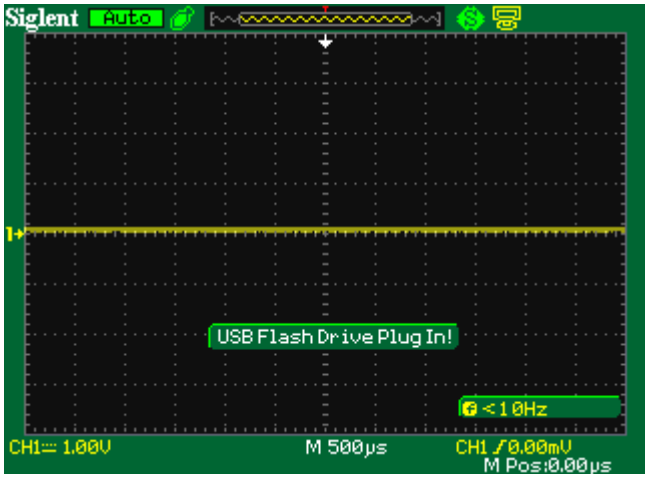


图 3-2 USB host connect Successfully

3．Press Save/Recall ⟶Save to file, to name renewably or delete the information in U disc.

4．Remove the U disc and a prompt message “USB Flash Drive Plug In!” will appeared.

USB Device Test

Purpose: Test if the USB Device interface works normally through EasyScope for SDS1000D series oscilloscope.

Tools：

- An Unit SDS1000D digital oscilloscope
- A computer with USB interface
- A standard USB cable(Type AB)
- EasyScope software for SDS1000D series

Steps：

1. Install the EasyScope to computer.
2. Connect the oscilloscope with PC using an USB cable and install the driver program step by step following the instruction.

Picture 3-3 connecting the USB Device interface

3. Run EasyScope ,then click “Connect”, if successful, the two point lamps at the top right corner of the software will be changed from red to green.; if failed, a prompt message will be appeared as below.

Picture 3-4 USB Device connect failed

RS-232 Test

Purpose: Test if the RS-232 interface works normally through EasyScope for SDS1000D series oscilloscope.

Tools：

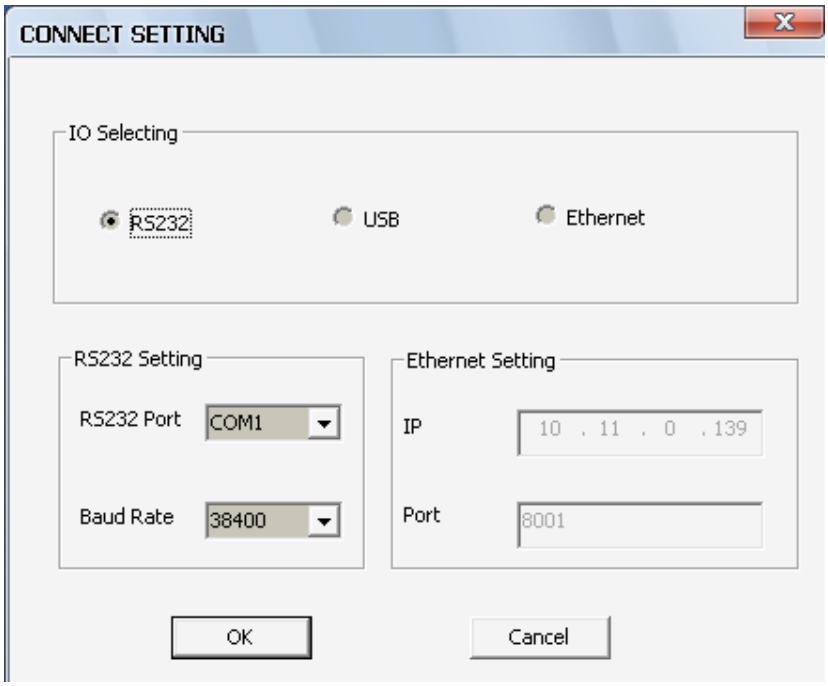
- An Unit SDS1000D digital oscilloscope
- A computer with RS-232 interface
- A standard RS-232 cable
- EasyScope software for SDS1000D series.

Steps：

1. Install the EasyScope to computer.
2. Connect the oscilloscope with PC using an USB cable

Picture 3-5 Connect the RS232 interface

3. Run EasyScope，click “Setting”⟶“Connect Setting” , set the IO as below.



Picture 3-6 EasyScope connect setting

4. Press “UTILITY” ⟶ page3/4 ⟶ IO Setting, select the Baud as 38400
5. Click “Connect”, if successful, the two point lamps at the top right corner of the software will be changed from red to green.; if failed, a prompt message will be appeared as below.

Picture 3-7 RS-232 connect failed

Pass/Fail Test

Purpose: Test if the Pass/Fail interface works normally through the signal from the back BNC of the oscilloscope.

Tools：

- An Unit SDS1000D digital oscilloscope , another digital oscilloscope
- A BNC cable
- A Probe

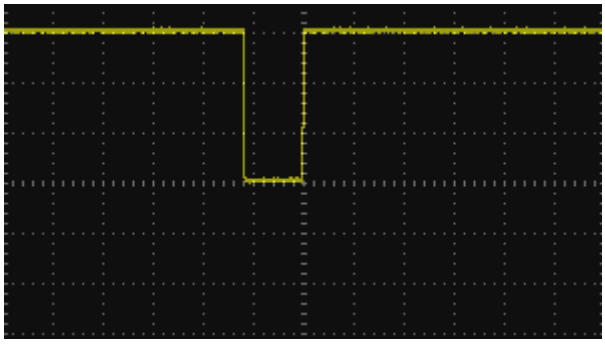
Steps：

1. Power-On two oscilloscopes.
2. Connect the Pass/Fail interface of SDS1000D with the channel BNC of another oscilloscope using the BNC cable.
3. Connect the probe to channel 1 on SDS1000D, and press AUTO button.
4. Press “UTILITY” button ⟶ page3/4 ⟶ Pass/Fail, set the function item as below:

Table 3-1 Pass/Fail function item

Option	**Setting**
Enable Test	On
Source	CH1
Msg Display	On
Output	Pass
Stop On Output	Off

5. Click “Mask Setting”⟶ Create Mask, and back to Page1/2, then press “Operate” button.
6. Adjust the time base and volt of another scope, if there is a pulse wave as below appeared on the screen, which show the interface works normally, if no response or another wave on the screen, errors might happen to the interface.



Picture 3-8 Pass/Fail interface works normally

Specification Test

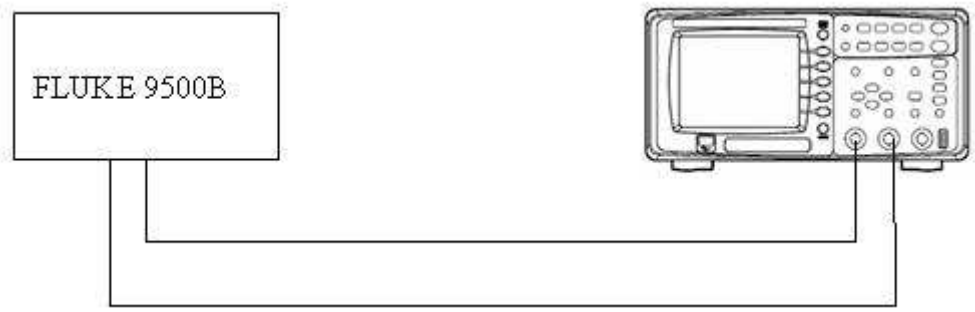
Purpose: Test if some specifications are in the specified range.

Table 3-2 require instruments

Description	Minimum requirements	Examples
DC Voltage Source	-6 mV to 30 V, ±0. 1% accuracy	FLUKE 9500B
Standard sine wave generator	10Hz and 300MHz, ±1% amplitude accuracy	
50 Ω BNC Feed-Through Termination	DC to 1GHz	PL-50

Before beginning these procedures, two conditions must first be met:

- The oscilloscope must have been operating continuously for thirty minutes within the operating temperature range specified.
- You must do the Self Calibration procedure. If the ambient temperature changes by more than 5℃, you must do the Self Calibration procedure again.



Picture 3-9 Test instrument connecting

Test DC Gain Accuracy

Steps： 1、Set the DC voltage source output level to 30 V

2、Press the button “DEFAULT/SETUP” of oscilloscope

3、Set VOLT/DIV to 10V/div, set measure parameter as “CH1,Mean”

4、Connect the oscilloscope channel 1 to the DC voltage source, and record the value of Mean appeared on the screen as V_{pos}.

5、Change the polarity of the DC voltage source，and record the value of Mean appeared on the screen as V_{neg}.

6、Calculate $V_{diff}=V_{pos}-V_{neg}$ ， then compare V_{diff} to accuracy limits in the table.

Volt/div setting	DC voltage output level	Accuracy limits for V_{diff}
10v/div	+30V, -30V	58.2 V～61.8 V
5v/div	+15V, -15V	29.1 V～30.9 V
2v/div	+6V, -6V	11.64 V～12.36 V
1v/div	+3V, -3V	5.82 V～6.18 V
500mv/div	+1.5V, -1.5V	2.91 V～3.09 V
200mv/div	+600mV, -600mV	1.164 V～1.236 V
100mv/div	+300mV, -300mV	582 mV～618 mV
50mv/div	+150mV, -150mV	291 mV～309 mV
20mv/div	+60mV, -60mV	116.4 mV～123.6 mV
10mv/div	+30mV, -30mV	58.2 mV～61.8 mV
5mv/div	+15mV, -15mV	29.1 mV～30.9 mV
2mv/div	+6mV, -6mV	11.52 mV～12.48 mV

7、Change the VOLT/DIV to the next Volt/div in the table, and set the DC voltage source output level to the corresponding level in the table as above. Repeat the steps 4 through 6 until all VOLT/DIV of both channels have been test.

Test Bandwidth

Steps： 1、Press the button “DEFAULT/SETUP”, and set the VOLT/DIV to 500 mV/div, set SEC/DIV to 50 mS/div.

2、Set the measure parameter as “CH1,Vpp”.

3、Connect the oscilloscope channel 1 to the standard sinewave generator

4、Set the standard sinewave generator frequency to 10Hz

5、Set the generator output level so the Vpp measurement is between 2.98 V and 3.02 V.

6、Set the generator frequency to:

25MHz if you are testing a SDS1022D
40MHz if you are testing a SDS1042D
60MHz if you are testing a SDS1062D
100MHz if you are testing a SDS1102D
150MHz if you are testing a SDS1152D
200MHz if you are testing a SDS1202D

7、Set the oscilloscope timebase to the minimum SEC/DIV

8、Check the Vpp measurement is ≥2.12 V

9、Test channel 2 with the same method

Test Trigger Sensitivity

Steps： 1、Press the button “DEFAULT/SETUP”, and set the VOLT/DIV to 500mv/div, set SEC/DIV to 25ns/div.

2、Connect the oscilloscope channel 1 to the standard sinewave generator

3、Set the standard sinewave generator frequency to 10 MHz

3、Set the generator output level so the Vpp measurement is about 500 mV.

4、Press the button “set to 50%”. Adjust LEVEL as necessary and then check that triggering is stable.

5、Set the generator frequency to:

25MHz if you are testing a SDS1022D

40MHz if you are testing a SDS1042D

60MHz if you are testing a SDS1062D

100MHz if you are testing a SDS1102D

150MHz if you are testing a SDS1152D

200MHz if you are testing a SDS1202D

6、Set the generator output level so the Vpp measurement is about 750 mV.

7、Press the button “set to 50%”. Adjust LEVEL as necessary and then check that triggering is stable.

8、Test channel 2 with the same method

Test Noise

Steps： 1、 Set the both channels VOLT/DIV to 2mV/div，SEC/DIV to 2.5μS/div

2、 Set two measure parameters as “CH1,Vpp” and “CH2, Vpp”

3、 Check the Vpp measurement is ≤1.2mV （other VOLT/DIV is 0.6 DIV ）

4、 Change the VOLT/DIV, and check the Vpp until all the VOLT/DIV of both channel have been tested.

Chapter 4 Calibration

Self Calibration

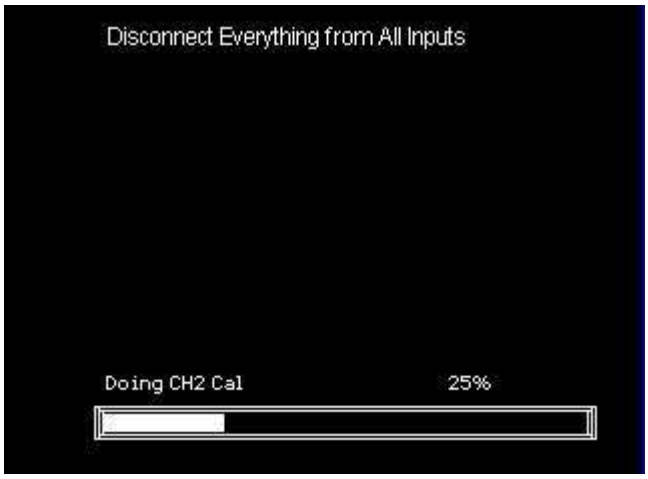
Self Calibration procedure can optimize the signal path at the most measurement precision.
You can run this procedure at any time. If the operating temperature changes by more than 5℃ or the units run less than thirty minutes, you should do the self calibration.

Steps:

1. Cut off all the probes and lead.
2. Press the button “UTILITY” to choose the Do Self Cal to show the self calibration menu, and execute self calibration program according to the prompting on the screen.

Picture 4-1 Calibration beginning interface

3. Press “SINGLE” to do self calibration.



Picture 4-2 Calibrating

4. After the calibration finished, Press “SINGLE” key to exit.

Picture 4-3 Calibration succeed interface

Generally speaking, the self calibration will take about 3-5 minutes, if the calibration does not Pass after this time, or the progress bar stop at one of the calibration item, there may be a trouble in the instrument.

Chapter 5 Disassembly and Assembly

This chapter includes the following topics:

- Notice
- Disassemble and Assemble the on-off and knobs
- Disassemble and Assemble back rind
- Disassemble and Assemble back cover board
- Disassemble and Assemble top cover board
- Disassemble and Assemble fan
- Disassemble and Assemble power board
- Disassemble and Assemble metal shelf
- Disassemble and Assemble main board
- Disassemble and Assemble LCD
- Disassemble and Assemble keyboard

Notice

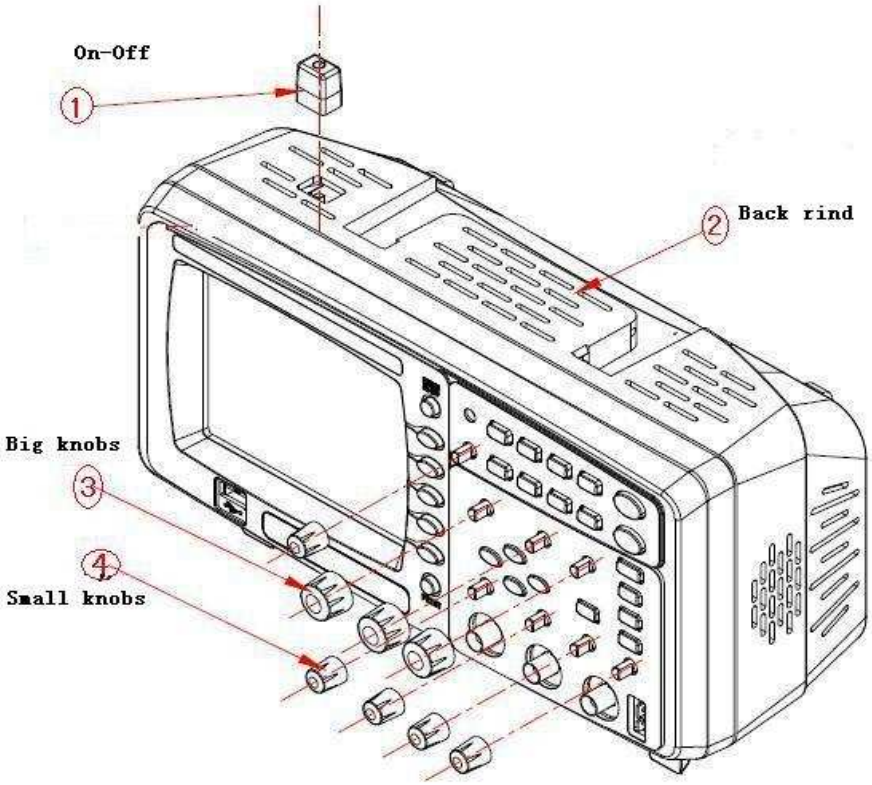
Notices：

- Don’t disassemble the products except the work need.
- Disassemble only can be done by qualified person.
- Cut the power before disassembling.
- Take static glove when disassembling.
- Use proper tools and follow the disassemble sequence.
- Prevent metal parts from transfiguration and avoid being scratched when disassembling.

Disassemble tools:

- screwdriver
- forceps
- wrench

Disassemble and Assemble On-off and Knobs



Picture 5-1 Disassemble and Assemble the on-off and knobs

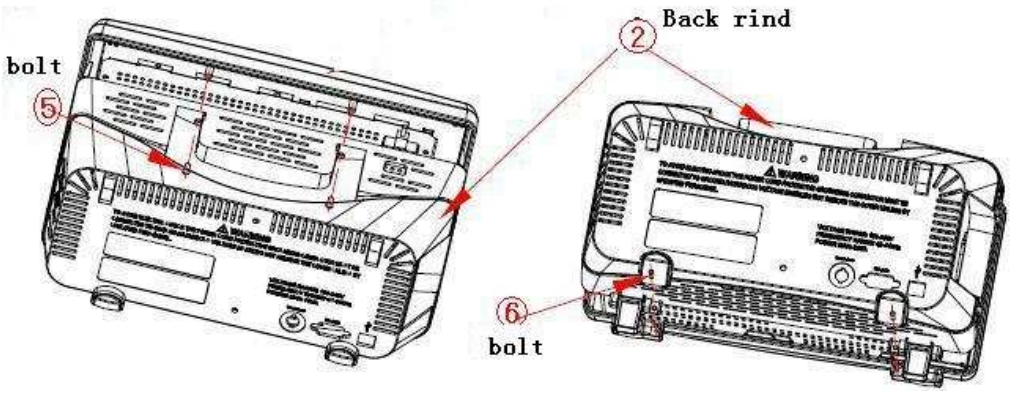
Disassemble steps：

1. Nip on-off ① button by forceps, and then pull up.
2. Cock knobs③、④ gently by forceps

Assemble steps：

Please operate as reverse orders. The same is as below.

Disassemble and Assemble Back Rind



Picture 5-2 Disassemble and Assemble back rind 1

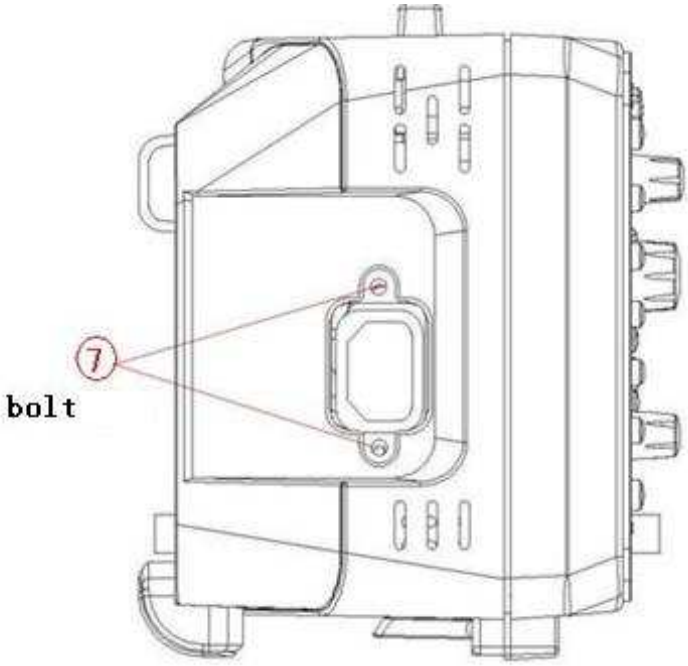
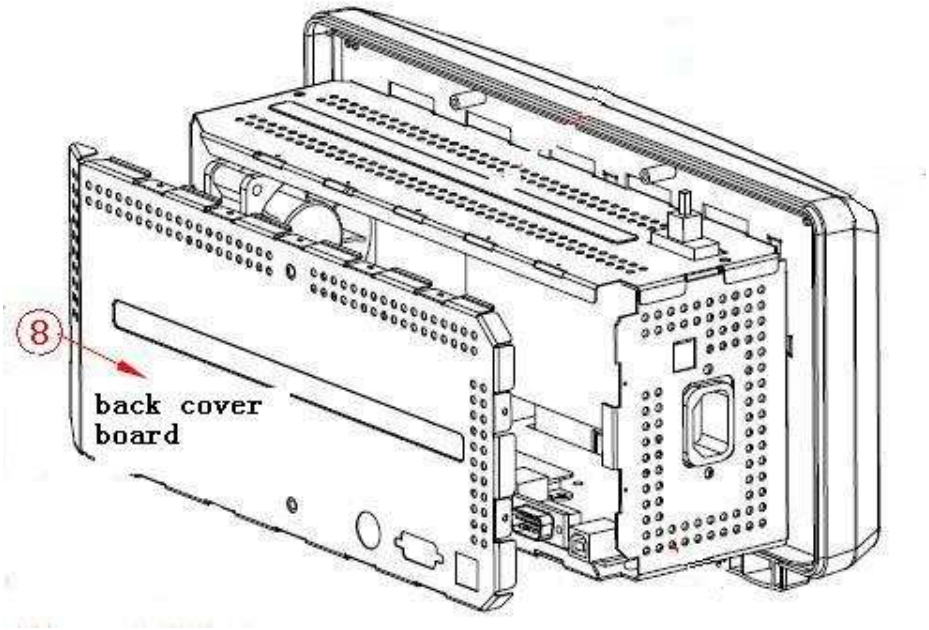


图 5-3 Disassemble and Assemble back rind 2

Disassemble steps：

1. Back out the two bolts⑤ and two bolts⑥.
2. Back out the two bolts⑦.
3. Remove the back rind.

Disassemble and Assemble Back Cover Board

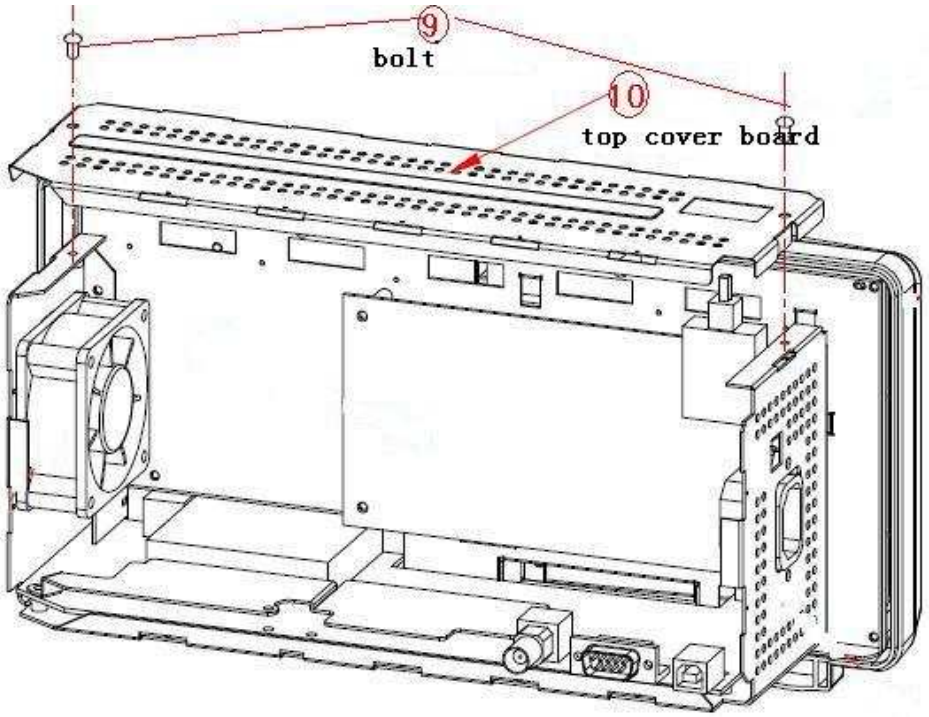


Picture 5-4 Disassemble and Assemble back cover board

Disassemble steps：

1. Remove the back cover board by the forceps.

Disassemble and Assemble Top Cover Board

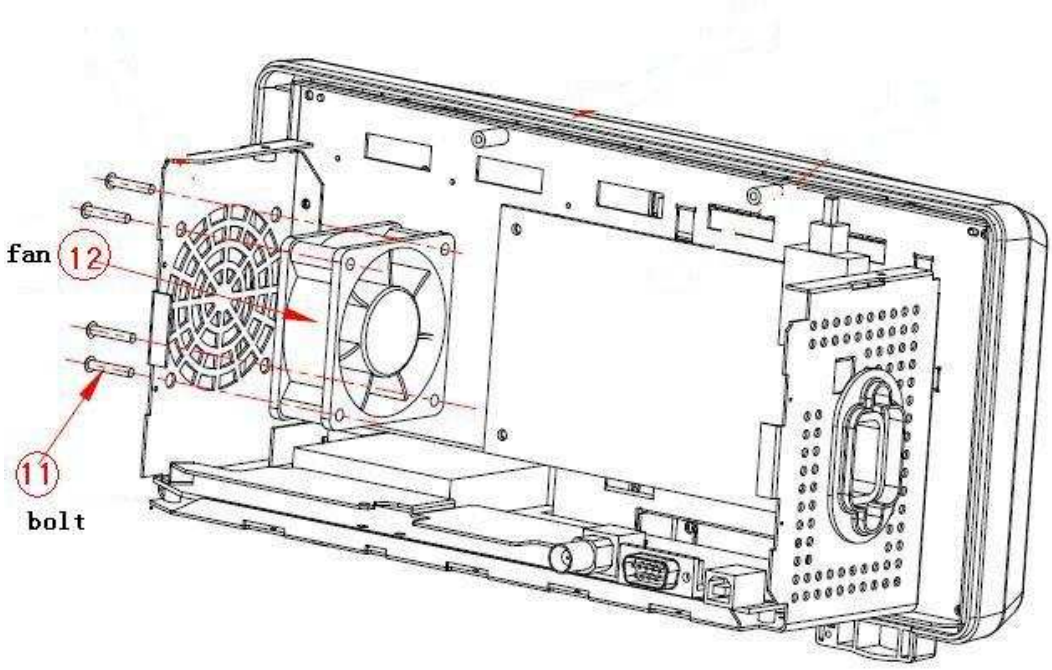


Picture 5-5 Disassemble and Assemble top cover board

Disassemble steps：

1. Back out the two bolts⑨.
2. Pull on the top cover board.

Disassemble and Assemble Fan



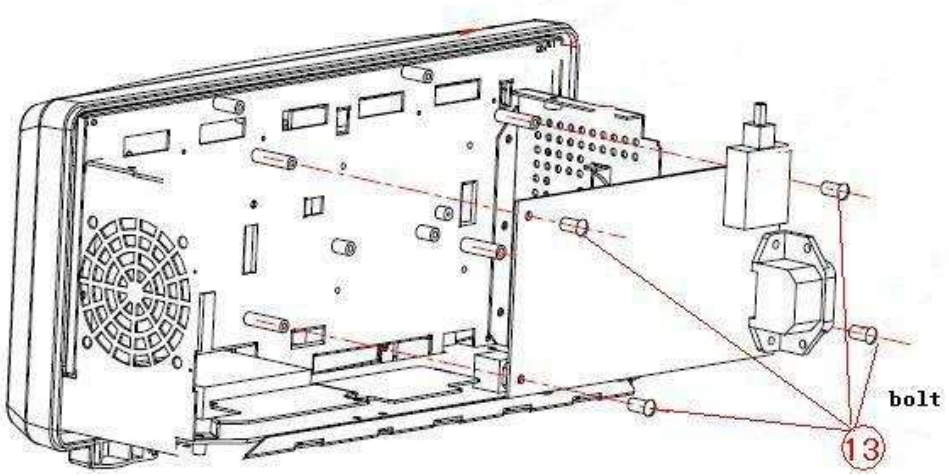
Picture 5-6 Disassemble and Assemble fan

Disassemble steps：

1. Back out the four bolts ⑪.

2. Remove the fan ⑫

Disassemble and Assemble power board

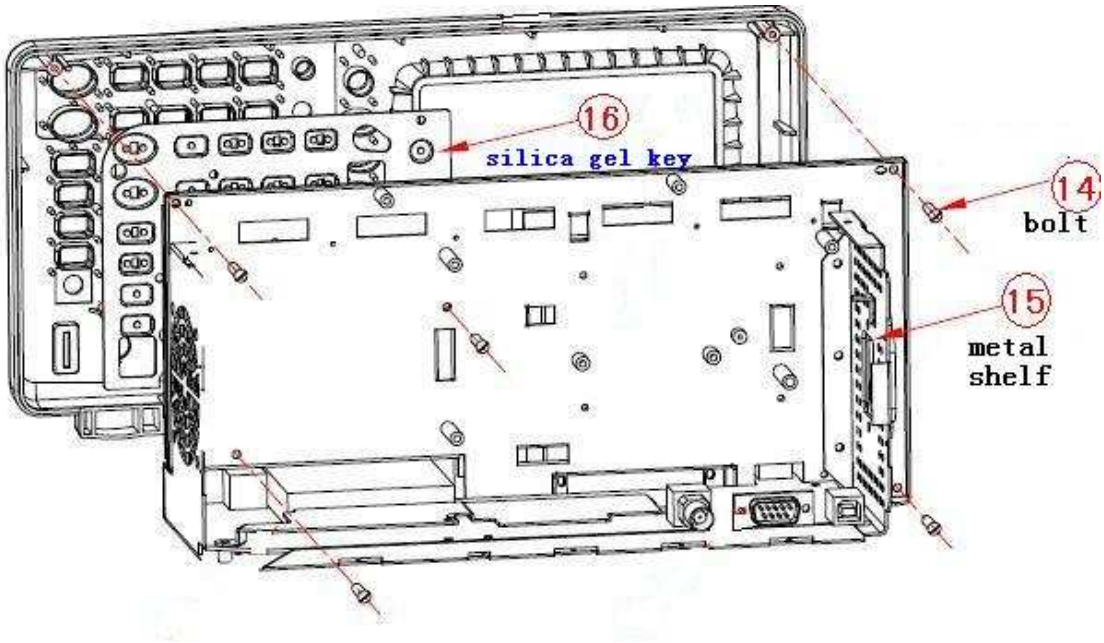


Picture 5-7 Disassemble and Assemble power board

Disassemble steps：

1. Back out the four bolts ⑬.
2. Pull out the power line from the main board and remove the power board.

Disassemble and Assemble Metal Shelf



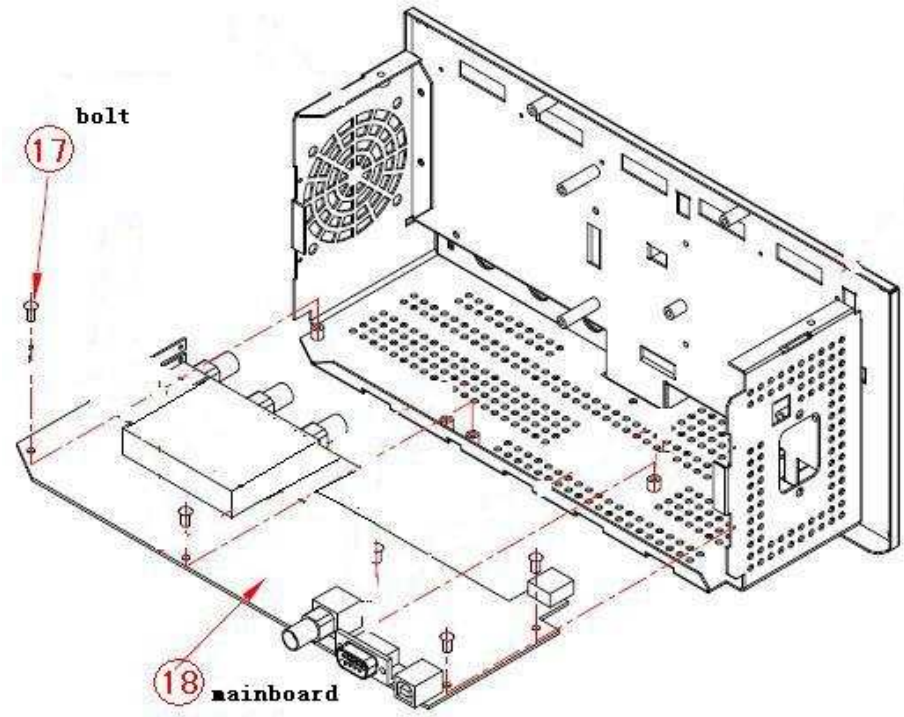
Picture 5-8 Disassemble and Assemble metal shelf

Disassemble steps：

1. Back out the four bolts ⑭, and remove the metal shelf ⑮.

2. Take off the silica gel key⑯.

Disassemble and Assemble Main board

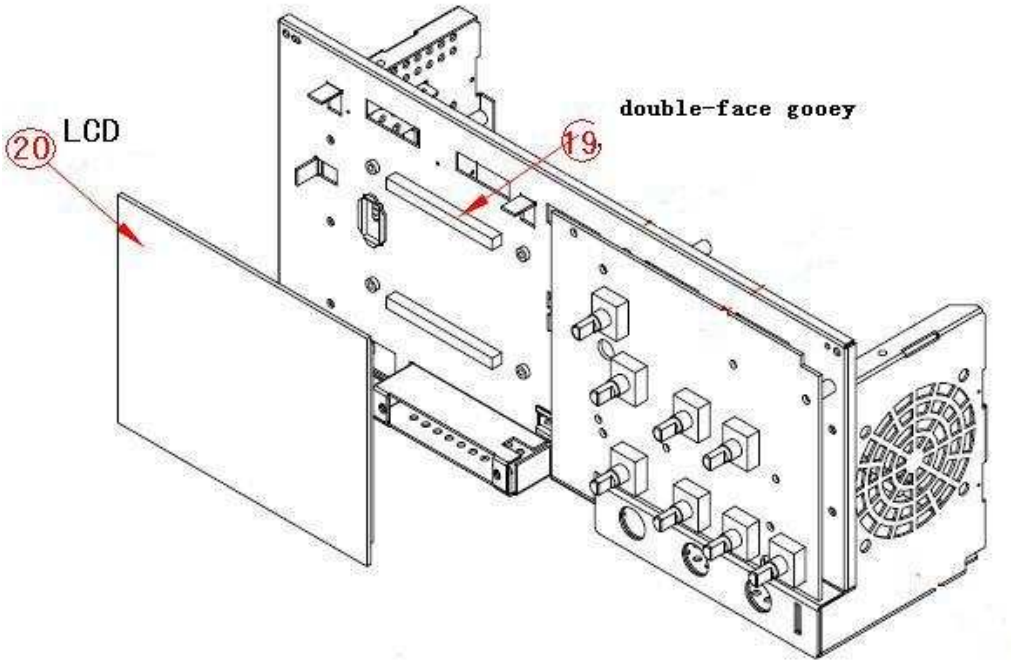


Picture 5-9 Disassemble and Assemble main board

Disassemble steps：

1. Back out the five bolts⑰.
2. Pull out the screen line and keyboard line from main board.
3. Back out the three big nuts from the BNC.
4. Pull out the main board⑱ slowly.

Disassemble and Assemble LCD

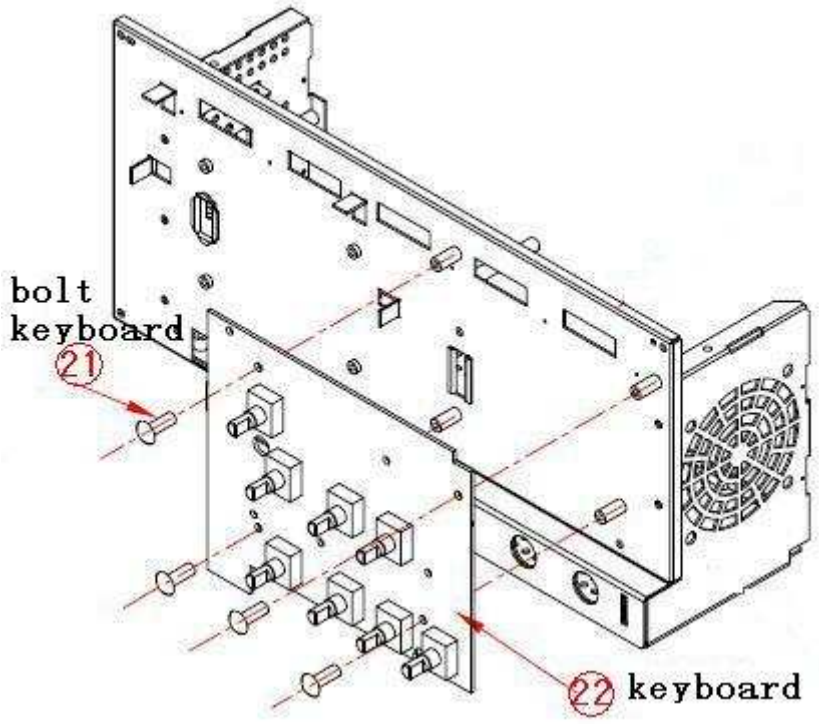


Picture 5-10 Disassemble and Assemble LCD

Disassemble steps：

1. Break off the LCD ⑳ with fingers and thumb.

Disassemble and Assemble Keyboard



Picture 5-11 Disassemble and Assemble keyboard

Disassemble steps：

1. Back out the four bolts ㉑ and remove the keyboard..

Chapter 6 Prompting Messages and Troubleshooting

Prompting messages:

■ **Trig level at limit!** : Mention you that the trigger Level is at a limit when you turn the Trig level knob.

■ **Horizon position at limit!** : Mention you that the horizontal position is at a limit when you turn the horizon position knob.

■ **Volts/Div at limit!** : Mention you that the vertical voltage have already touched the Min 2MV/div or the Max 5V/div.

■ **Volts position at limit!** : The system would display this information when the vertical position is at a limit.

■ **Sec/Div at limit!** : Prompts that the Volts/Div is at full range while turning the vertical scale knob.

■ **Holdoff time at limit! :** Turn the “Universal” knob when holdoff time has been to max or min value, now the system will clew this information.

■ **Functions isn’t useable!** : Under several special modes, the some functions could not be running.

■ **No signal! :** The system would clew this information when the signal could not match the auto set condition. (Using in the auto set)

■ **Adjust at limit! :** You could adjust the pulse width by the universal knob till the pulse width has reached min20.0ns or max 10.0s.

■ **Location Empty! :** If you have no stored waveforms or setups on some location, the screen will display this information when you press the “Recall” button on this location.

■ **USB Flash Drive Plug In! :** This information will appear when you invert the USB Flash Drive to the USB Host port.

■ **USB Flash Drive Pull Out! :** This information will appear when you pull out the USB Flash

Drive.

■ **Store Data Success! :** Save setup data, waveform data or picture data to the internal of the oscilloscope or USB flash successful.

■ **Ready Data Success! :** Read setup data or waveform data from the internal of the oscilloscope or USB flash successful.

■ **Please set back USB to printer! :** Press the “S/div” knob will appear this information on the screen when the “Print Key” option is set to “Print Picture” and the “Back USB” option is set to “Computer”.

■ **USB Flash Drive isn’t connected! :** When the “Save To” option is set to “File” or the “Print Key” option is set to “Save Picture” in “Save/Recall” menu , Press the “Save” option button or the “S/div” knob before inverting the USB Flash Drive to the USB Host port will appear this information on the screen.

■ **Record Wave Success! ：** This message will appear when you finish recording waveforms.

Troubleshooting

1. After the oscilloscope is powered on，the screen remains dark ， please do as following steps：

⑴ Check the power cable's connection.

⑵ Ensure the power switch is turned on.

⑶ After the inspections above， restart the oscilloscope.

⑷ If the oscilloscope is still not used after the checking, please connect with **SIGLENT** company

2. If there is no signal wave in the screen after gathering the signal, please do as following steps:

(1) Check whether the probe have connected with the signal cable or not.

(2) Check whether the signal cable have connected with the BNC connector or not.

(3) Check whether the probe has connected with the goods tested or not.

(4) Check whether tested goods have produced the signal or not.

(5) Gather the signal again.

3. The value of the tested voltage is 10 times higher/lower than the real one , please do as following steps:

Check the attenuation quotient whether match the probe attenuation proportion or not.

4. Display the wave, but not steady, please do as following steps:

(1) Check the signal source on the trigger interface whether or not matches the signal channel. Check the trigger mode: normal signal should use the "edge" trigger mode. The video signal should use the "Video" Trigger mode. The signal would display steady, only using the matching trigger mode.

(2) Attempt to change the "coupling" into "HF Reject" or "LF Reject" display, so that the High/low frequency noise disturb the trigger should be filtrated

5. Press "RUN/STOP" button, but no display**.**

Check the trigger mode on the trigger interface whether or not in the "normal" or "single", and check the trigger level is whether or not over the wave range. If yes, please put the trigger level to the middle position or set the trigger mode to the "Auto" position. In another hand, you could choose the "Auto" button to set up automatically.

6. After the Acquisition is set to Averages or Display Persistence time is set too long, the waveform refreshes slowly.

It is normal in these settings

7. The signal is displayed as ladder like waveform

(1)This phenomenon is normal. The time base maybe is too slow .you should turn the horizontal SCALE knob to increase horizontal resolution to improve the display.

(2) Maybe the display Type is set to "Vectors", You could set it to Dots mode to improve the display.

Chapter 7 Updating Parts

SIGLENT Provide some replaceable parts in order to maintain or update for users. Please see as the following table. Note that the numbers in the table.

Table 7-1 Updating Parts Item

No.	Name	Specification
1	On-Off button	
2	Back Rind	
3	Big knobs	
4	Small knobs	
5	Bolts	PM2.5*10
6	Bolts	PA3*8
7	Bolts	PA3*10
8	Back cover board	
9	Bolts	KM3*8
10	Top cover board	
11	Bolts	KM3*30
12	Fan	
13	Bolts	BM3*8
14	Bolts	PA3*8
15	Metal shelf	
16	Silica gel key	
17	Bolts	BM3*8
18	Main board	
19	BNC nuts	
20	LCD	
21	Bolts	KM3*8
22	Keyboard	
23	Front panel	

All the parts are available by contacting your local **SIGLENT** office..