

RIGOL

Service Guide

DG1000 Series Dual-channel Function/Arbitrary Waveform Generator

**Oct. 2015
RIGOL TECHNOLOGIES, INC.**

Guaranty and Declaration

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Publication Number

SGB06102-1110

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Contact Us

If you have any problem or requirement when using our products or this manual, please contact **RIGOL** TECHNOLOGIES, INC.

E-mail: service@rigol.com

Website: www.rigol.com

Safety Requirement

General Safety Summary

Please review the following safety precautions carefully before putting the instrument into operation so as to avoid any personal injury or damage to the instrument and any product connected to it. To prevent potential hazards, please follow the instructions specified in this manual to use the instrument properly.

Use Proper Power Cord.

Only the exclusive power cord designed for the instrument and authorized for use within the local country could be used.

Ground the Instrument.

The instrument is grounded through the Protective Earth lead of the power cord. To avoid electric shock, connect the earth terminal of the power cord to the Protective Earth terminal before connecting any input or output terminals.

Connect the Probe Correctly.

If a probe is used, do not connect the ground lead to high voltage since it has isobaric electric potential as the ground.

Observe All Terminal Ratings.

To avoid fire or shock hazard, observe all ratings and markers on the instrument and check your manual for more information about ratings before connecting the instrument.

Use Proper Overvoltage Protection.

Ensure that no overvoltage (such as that caused by a bolt of lightning) can reach the product. Otherwise, the operator might be exposed to the danger of an electric shock.

Do Not Operate Without Covers.

Do not operate the instrument with covers or panels removed.

Do Not Insert Anything Into the Air Outlet.

Do not insert anything into the air outlet to avoid damage to the instrument.

Use Proper Fuse.

Please use the specified fuses.

Avoid Circuit or Wire Exposure.

Do not touch exposed junctions and components when the unit is powered on.

Do Not Operate With Suspected Failures.

If you suspect damage occurs to the instrument, have it inspected by **RIGOL**

authorized personnel before further operations. Any maintenance, adjustment or replacement especially to circuits or accessories must be performed by **RIGOL** authorized personnel.

Provide Adequate Ventilation.

Inadequate ventilation may cause an increase of temperature in the instrument, which would cause damage to the instrument. So please keep the instrument well ventilated and inspect the intake and fan regularly.

Do Not Operate in Wet Conditions.

To avoid short circuiting to the interior of the instrument or an electric shock, never operate the instrument in a humid environment.

Do Not Operate in an Explosive Atmosphere.

To avoid personal injuries or damage to the instrument, never operate the instrument in an explosive atmosphere.

Keep Instrument Surfaces Clean and Dry.

To avoid dust or moisture from affecting the performance of the instrument, keep the surfaces of the instrument clean and dry.

Prevent Electrostatic Impact.

Operate the instrument in an electrostatic discharge protective environment to avoid damage induced by static discharges. Always ground both the internal and external conductors of cables to release static before making connections.

Use the Battery Properly.

Do not expose the battery (if available) to high temperature or fire. Improper change of a battery (lithium battery) may cause an explosion. Use the **RIGOL** specified battery only.

Handle with Caution.

Please handle with care during transportation to avoid damage to keys, knobs, interfaces and other parts on the panels.

Safety Notices and Symbols

Safety Notices in this Manual:



WARNING

Indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury.



CAUTION

Indicates a potentially hazardous situation which, if not avoided, could result in damage to the product or loss of important data.

Safety Terms on the Product:

DANGER It calls attention to an operation, if not correctly performed, could result in injury or hazard immediately.

WARNING It calls attention to an operation, if not correctly performed, could result in potential injury or hazard.

CAUTION It calls attention to an operation, if not correctly performed, could result in damage to the product or other devices connected to the product.

Safety Symbols on the Product:



Hazardous
Voltage



Safety
Warning



Protective
Earth
Terminal



Chassis
Ground



Test
Ground

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Chapter 1 Disassembly and Assembly

Notices to Disassembly and Assembly

Notices:

- Do not disassemble the instrument unless for working requirement.
- Only authorized personnel are allowed to disassemble the instrument.
- Cut off the power supply before disassembling the instrument.
- Please wear anti-static wrist strap or make other anti-static precaution when disassembling the instrument.
- Please use proper tools and follow the correct steps.
- Take care not to deform the metal structure or get hurt when disassembling the metal structures.
- To avoid causing damage to the instrument due to improper operation and to save your time, we recommend you to follow the disassembly steps and methods in this guide manual.

Required Tools:

- Phillips screwdriver T20 and T10
- BNC socket wrench



WARNING

Ensure that the power supply is cut off before disassembling the instrument. Only well-trained professional personnel or qualified personnel are allowed to disassemble the instrument.

Note:

DG1000 series dual-channel function/arbitrary waveform generator consists of two models: DG1022 and DG1022A. In this manual, DG1022 is taken as an example for illustration and the contents are also applicable to DG1022A.

Instrument Appearance

The figure below is the appearance drawing of DG1000 series dual-channel function/arbitrary waveform generator. You need to get a basic understanding of the main parts of the instrument before disassembling and assembling the instrument. When disassembling or assembling the instrument, please follow the procedures and take care not to scratch the surfaces of the instrument.

The recommended disassembly procedures are as follows:

Disassemble the Handle → Disassemble the Rear Cover → Disassemble the Metal Enclosure → Disassemble Rear BNC Boards → Disassemble the Power Supply Board → Disassemble the Main Board → Disassemble the Front Panel and LCD → Disassemble the Keypad Board

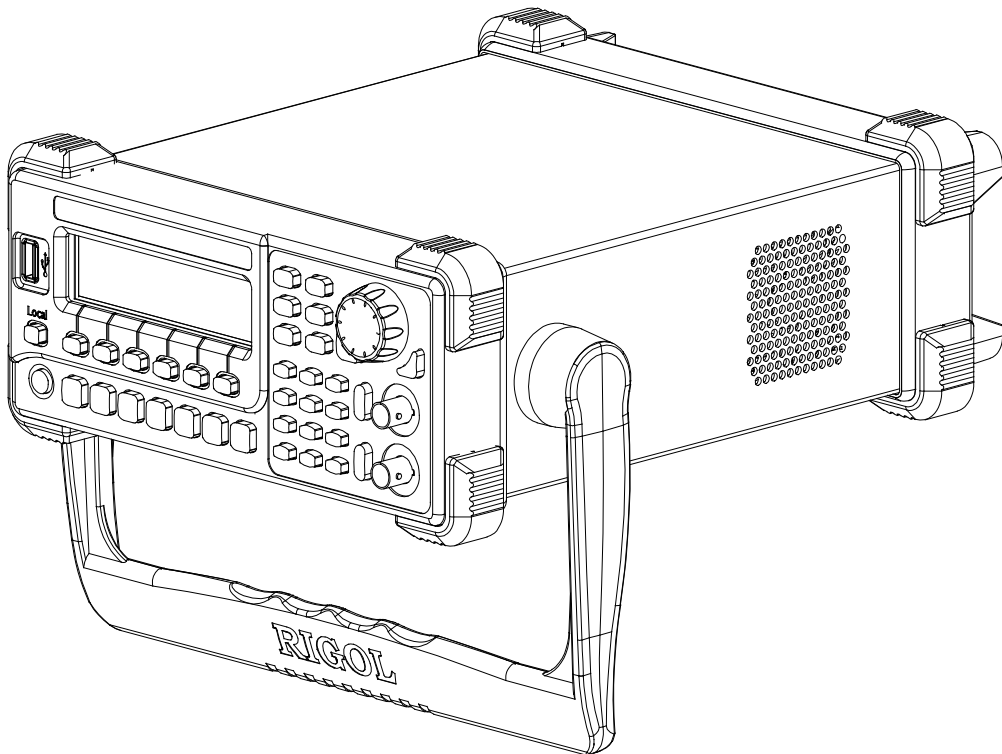


Figure 1-1 DG1000 Appearance Drawing

Disassemble the Handle

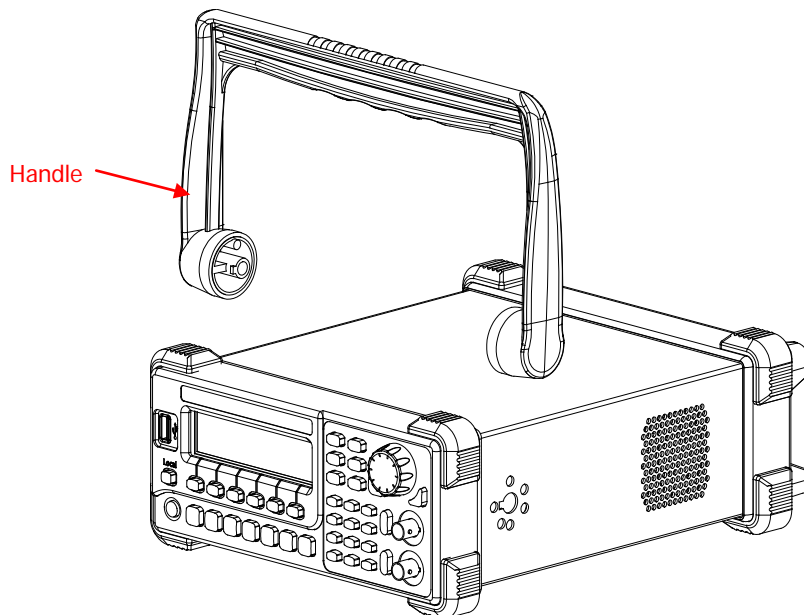


Figure 1-2 Disassemble the Handle

Disassembly Step:

Rotate the handle upright and pull out from the sides of the instrument to remove the handle.

Disassemble the Rear Cover

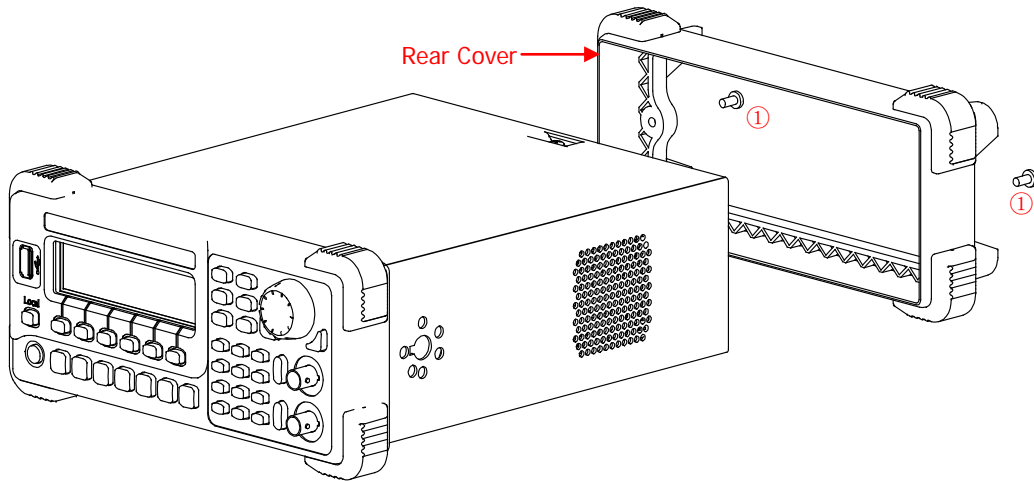


Figure 1-3 Disassemble the Rear Cover

Part Description:

- ① 2 screws (M4×8 torx pan head screw, used for fastening the rear cover to the metal chassis)

Disassembly Steps:

1. Use the T20 screwdriver to remove 2 screws (①) that fasten the rear cover to the metal chassis.
2. Take off the rear cover gently (Note: Pay attention to the direction of the rear cover when assembling it, do not turn the rear cover upside down).

Disassemble the Metal Enclosure

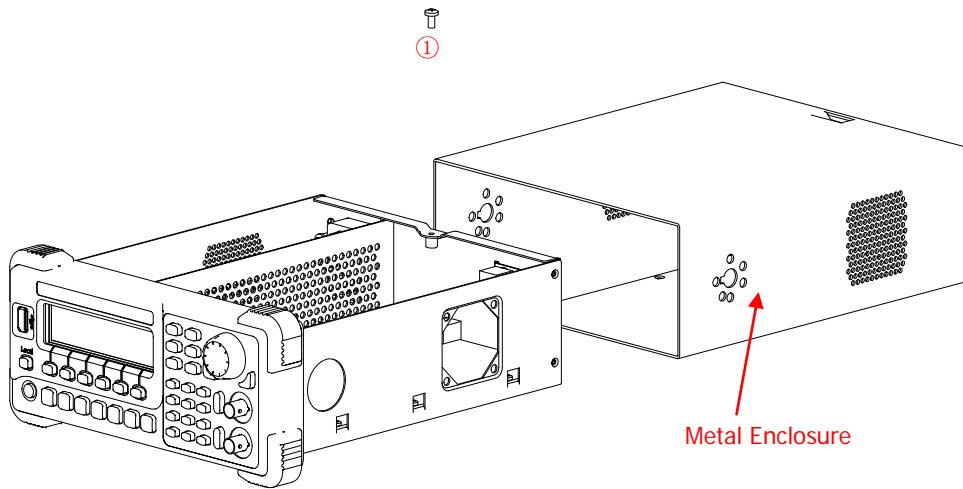


Figure 1-4 Disassemble the Metal Enclosure

Part Description:

- ① 1 screw (M4×8, torx pan head screw, used for fastening the metal enclosure to the metal chassis)

Disassembly Steps:

1. Use the T20 screwdriver to remove the screw (①) that secures the metal enclosure.
2. Take off the metal enclosure gently.

Disassemble Rear BNC Boards

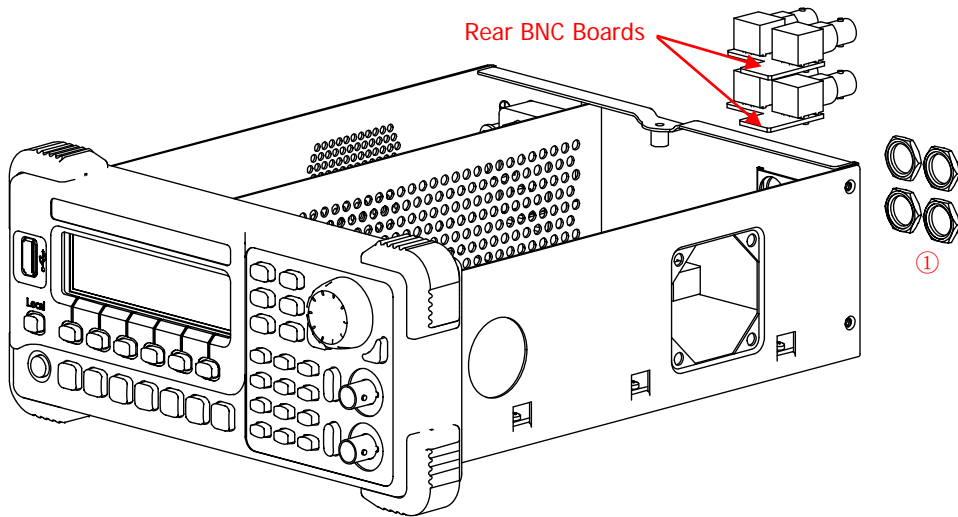


Figure 1-5 Disassemble Rear BNC Boards

Part Description:

- ① 4 BNC nuts.

Disassembly Steps:

1. Remove 4 BNC nuts (①) using the BNC socket wrench.
2. Take out two rear BNC boards from the metal chassis and remove two 10-pin cables that connect the main board.

Note:

There are two sets of rear BNC boards and each board has two BNC connectors on it. When assembling, follow the bottom-up assembly procedure. First, insert the 10-pin cable of the rear BNC board into the slot of the main board; then from inside the metal chassis, get two BNC connectors on the rear BNC board through two holes located at the lower position of the rear BNC fixture, then fasten them to the fixture using two BNC nuts. Perform the same assembly procedure for another set of the rear BNC board.

Disassemble the Power Supply Board

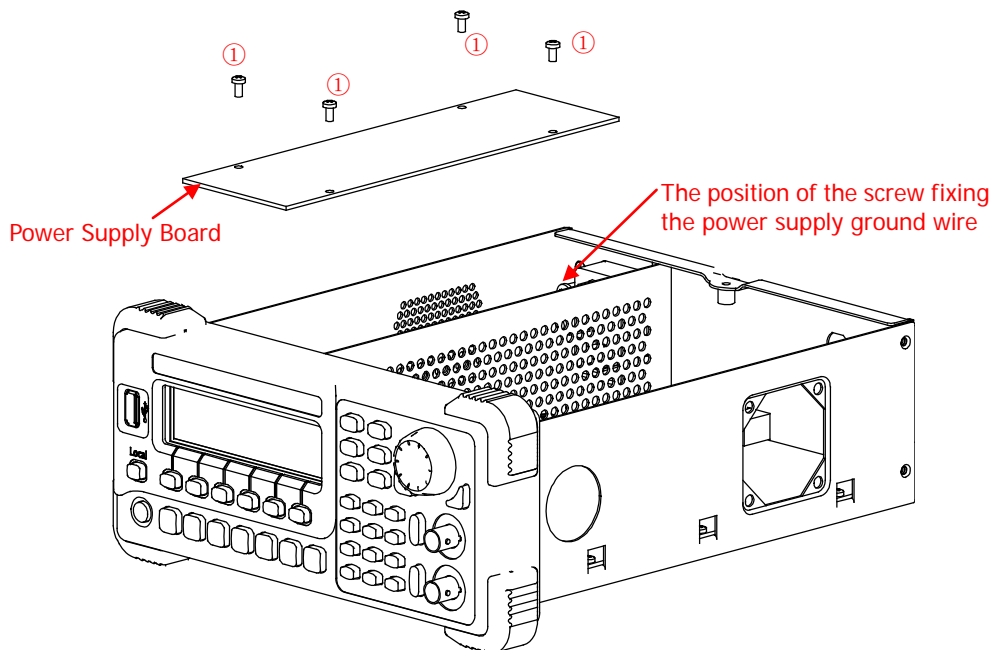


Figure 1-6 Disassemble the Power Supply Board

Part Description:

- ① 4 screws (M3×6 **torx pan head combination screws**, used for fastening the power supply board to the metal chassis)

Disassembly Steps:

1. Remove the M4×8 torx pan head screw (as indicated in the figure above) that fastens the power supply ground wire to the metal chassis using the T20 screwdriver.
2. Disconnect the wires on the power supply board.
3. Remove 4 screws (①) that fasten the power supply board to the metal chassis using the T20 screwdriver.
4. Take out the power supply board.

Note:

Before disconnecting the wires on the power supply board, remember the connection methods and positions of the wires to avoid incorrect connection when assembling.

Disassemble the Main Board

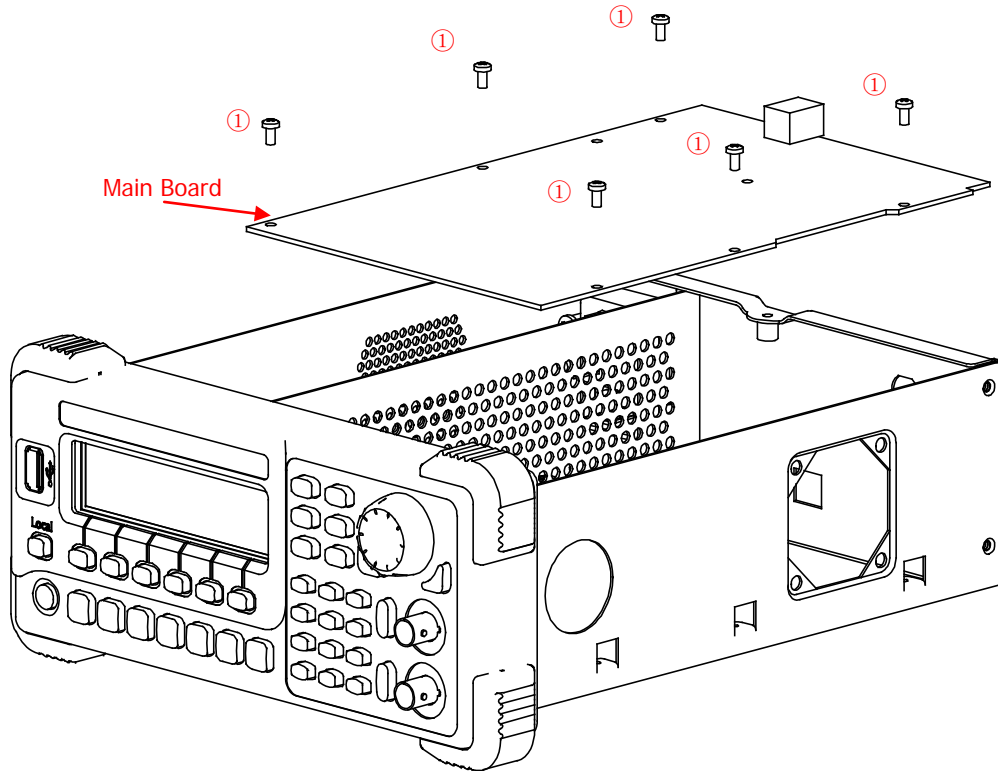


Figure 1-7 Disassemble the Main Board

Part Description:

- ① 6 screws (M3×6 torx pan head combination screws, used for fastening the main board to the metal chassis)

Disassembly Steps:

1. Disconnect the wires on the main board.
2. Remove 6 screws (①) that fasten the main board to metal chassis using the T10 screwdriver.
3. Take out the main board.

Note:

Disassembling the main board is not recommended unless otherwise required. Before disconnecting wires on the main board, remember the connection methods and positions of the wires to avoid incorrect connection when assembling.

Disassemble the Front Panel and LCD

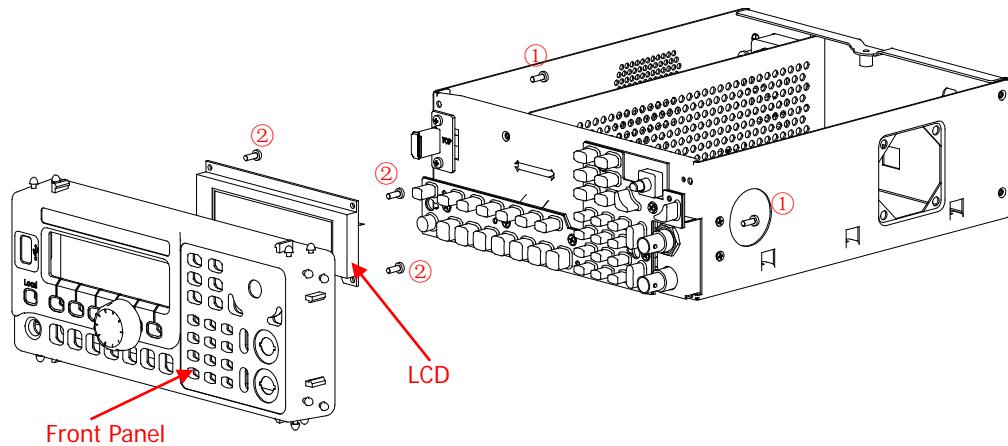


Figure 1-8 Disassemble the Front Panel and LCD

Part Description:

- ① 4 screws (PTP3×8 torx pan head self-tapping screw, used for fastening the front panel to the metal chassis)
- ② 3 screws (PTP3×8 torx pan head self-tapping screw, used for fastening the LCD to the front panel).

Disassembly Steps:

1. Remove 4 screws (①) that fasten the front panel to the metal chassis using the T10 screwdriver.
2. Remove the knob on the front panel.
3. Take off the front panel gently.
4. Remove 3 screws (②) that fasten the LCD to the front panel using the T10 screwdriver.
5. Take off the LCD gently.

Disassemble the Keypad Board

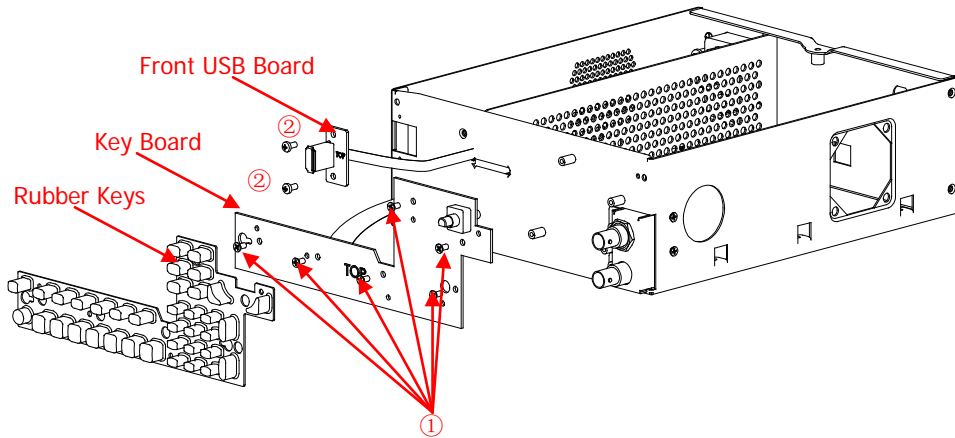


Figure 1-9 Disassemble the Keypad Board

Part Description:

- ① 6 screws (M3×6 torx flat head countersunk screws, used for fastening the keypad board to the metal chassis)
- ② 2 screws (M3×6 torx pan head combination screws, used for fastening the front USB board to the metal chassis)

Disassembly Steps:

1. Take off the rubber keypad.
2. Remove 6 screws (①) that fasten the keypad board to the metal chassis using the T10 screwdriver, then take off the keypad board.
3. Remove 2 screws (②) that fasten the front USB board to the metal chassis using the T10 screwdriver, then take off the front USB board.

Assembly Procedures

The assembly procedures are simply the reversal of the disassembly procedures. Check whether the cables are correctly connected and whether all the screws are installed after completing each assembly procedure.

Chapter 2 Troubleshooting&Maintenance

Troubleshooting

The commonly encountered failures of DG1000 and their solutions are listed below. When you encounter those problems, please observe the following instructions to resolve them. If the problem still persists, please contact **RIGOL**.

1. **The screen stays black/does not display anything after the instrument powers on.**
 - (1) Check whether the power cord is correctly connected.
 - (2) Check whether the power switches on the front and rear panels are all turned on.
 - (3) Restart the instrument after completing the above inspections.
 - (4) If the problem still persists, please contact **RIGOL**.

2. **The settings are correct but no waveform is generated.**
 - (1) Check whether the BNC cable is correctly connected to the signal output terminal.
 - (2) Check whether the BNC cable works normally.
 - (3) Check whether the **Output** button is turned on.
 - (4) After the above inspections, press **Utility** → **System** → **Setting** → **PowOn** → **Latest** and then restart the instrument.
 - (5) If the problem still persists, please contact **RIGOL**.

Maintenance

System Maintenance

In order to ensure the performance and prolong the service life of the instrument, please follow the recommendations below.

1. Get a full understanding of the instrument performance and its basic operating method before using it.
2. In order to ensure the measurement accuracy and prolong the service life of the instrument, protect the instrument against dust, shock, moisture, magnetic field and static electricity. Moreover, the instrument should not be exposed to sunlight for long periods of time.
3. Do not operate the instrument with functional failures. If a certain function of the instrument fails to work normally during its operating period, locate the problem and resolve it, then you can continue to operate the instrument. Besides, regular test and calibration should be performed to ensure the accuracy of its performance.
4. Arrange the instrument properly after you complete the operation.
5. Keep instrument accessories properly for future use.

Exploded View Drawing and Replacement Parts List

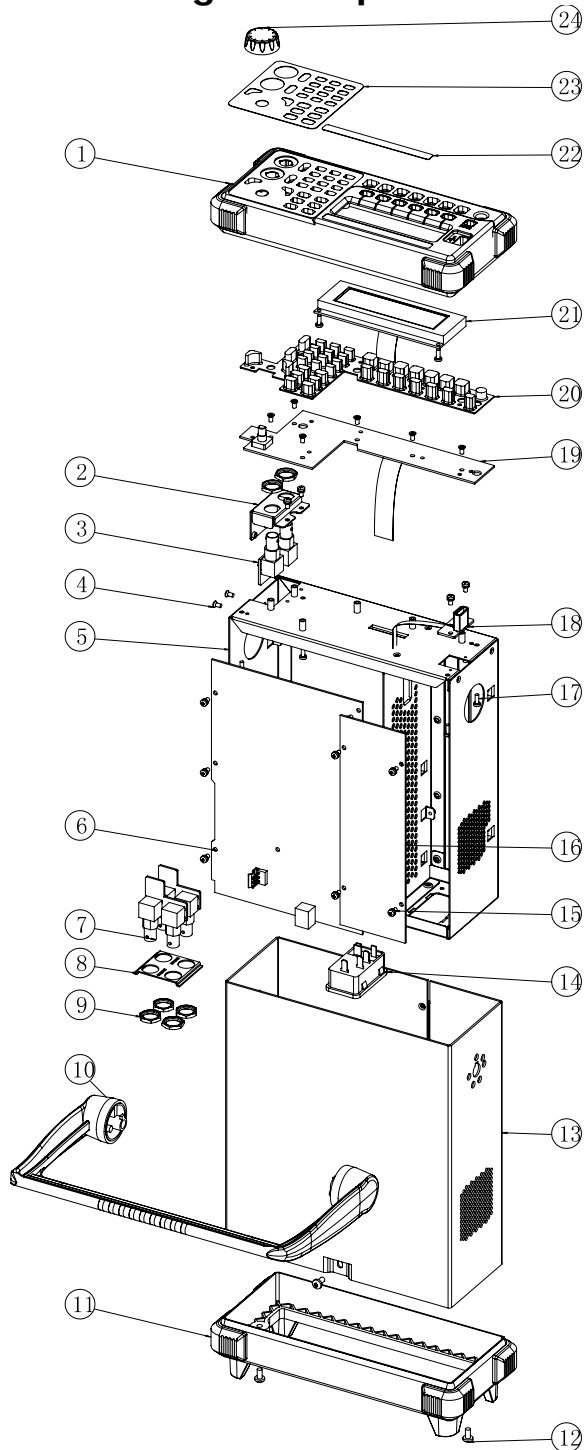


Figure 2-1 Exploded View Drawing

Table 2-1 Replacement Parts List

No.	Part No.	Qty.	Name/Description
1	2010003209	1	Front Panel
2	1020000075	1	Front BNC Fixture
3	2010000088	1	Front BNC Board
4	1020000579	8	M3×6 Torx Flat Head Countersunk Screw
5	1020000074	1	Metal Chassis
6	2010003639	1	Main Board
7	2010003319	2	Rear BNC Board
8	1020000071	1	Rear BNC Fixture
9	1020000619	6	BNC Nut
10	2010000346	1	Handle
11	2010003212	1	Rear Cover
12	1020000561	4	M4×8 Torx Pan Head Screw
13	1020000076	1	Metal Enclosure
14	1010001926	1	Power Socket
15	1020000571	14	M3×6 Torx Pan Head Combination Screw
16	2010002259	1	Power Supply Board
17	1020000589	7	PTP3×8 Torx Pan Head Self-tapping Screw
18	2010000089	1	Front USB Board
19	2010000066	1	Keypad Board
20	1020000032	1	Dual-channel Rubber Keypad
21	2010003390	1	LCD
22	1020000336	1	DG1022 Front Label
	1020001347	1	DG1022A Front Label
23	1020000334	1	Controls Film
24	2010000345	1	Knob

Warranty

RIGOL warrants that the product mainframe and product accessories will be free from defects in materials and workmanship within the warranty period.

If a product proves defective within the respective period, **RIGOL** guarantees free replacement or repair of any defective products within a reasonable period of time. To get repair service, please contact with your nearest **RIGOL** sales and service office.

There is no other warranty, expressed or implied, except such as is expressly set forth herein or other applicable warranty card. There is no implied warranty of merchantability or fitness for a particular purpose. Under no circumstances shall **RIGOL** be liable for any consequential, indirect, ensuing or special damages for any breach of warranty in any case.

Care and Cleaning

Care

Do not store or leave the instrument where it may be exposed to direct sunlight for long periods of time.

Cleaning

Clean the instrument regularly according to its operating conditions. To clean the exterior surface, perform the following steps:

1. Disconnect the instrument from all power sources.
2. Clean the dust on the instrument with a lint- free cloth (with a mild detergent or water). When cleaning the LCD, take care to avoid scarifying it.

**CAUTION**

To avoid damage to the instrument, do not expose it to caustic liquids.

**WARNING**

To avoid short-circuit resulting from moisture or personal injuries, ensure that the instrument is completely dry before connecting it to the power supply.
