Agilent 16064B LED Display/Trigger Box

Operation and Service Manual

Agilent Technologies

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Second Edition

Notice

The information contained in this document is subject to change without notice.

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Warranty

This Agilent Technologies instrument product is warranted against defects in material and workmanship for a period of one year from the date of shipment, except that in the case of certain components listed in this manual, the warranty shall be for the specified period. During the warranty period, Agilent Technologies will, at its option, either repair or replace products which prove to be defective.

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Manual Printing History

The manual printing date and part number indicate its current edition. The printing date changes when a new edition is printed. (Minor corrections and updates which are incorporated at reprint do not cause the date to change.) The manual part number changes when extensive technical changes are incorporated.

November 1991 ..... First Edition (part number: 16064-90010)

March 2000 ..... Second Edition (part number: 16064-90010)

Safety Summary

The following general safety precautions must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions or with specific *WARNINGS* given elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument.

The Agilent Technologies assumes no liability for the customer's failure to comply with these requirements.

Do NOT operate in an Explosive Atmosphere

Do *not* operate the instrument in the presence of flammable gasses or fumes. Operation of any electrical instrument in such an environment constitutes a safety hazard.

Keep Away from Live Circuits

Operating personnel must not remove instrument covers. Component replacement and internal adjustments must be made only by qualified maintenance personnel. Do not replace components with the power cable connected. Under certain conditions, dangerous voltages may exist even with the power cable removed. To avoid injury, always disconnect power and discharge circuits before touching them.

Do NOT Service or Adjust While Alone

Do *not* attempt internal service or adjustment unless another person, capable of turning off power and capable of rendering first aid and resuscitation, is present.

Do NOT Substitute Parts or Modify Instrument

Because of the danger of introducing additional hazards, do *not* substitute parts or perform unauthorized modifications to the instrument. Return the instrument to a Agilent Technologies Sales and Service Office for service and repair to ensure the safety features are maintained.

Dangerous Procedure Warnings

Warnings, such as the example below, precede *POTENTIALLY DANGEROUS PROCEDURES* throughout this manual. Instructions contained in the **warnings** must be followed.

Warning

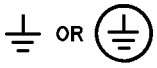
Dangerous voltages, capable of causing death, are present in this instrument. Use extreme caution when handling, testing, and adjusting this instrument.

Safety Symbols

General definitions of safety symbols used on equipment or in manuals.

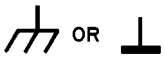
Instruction manual symbol: the product will be marked with this symbol when it is necessary for the user to refer to the instruction manual in order to protect against damage to the instrument.

Indicates dangerous voltage (terminals fed from the interior by voltage exceeding 1000 volts must be so marked).



Protective ground terminal. For protection against electrical shock in case of a fault in the instrument. Used with wiring terminals to indicate the terminal which must be connected to ground before operating equipment.

Low-noise or noiseless, clean ground (earth) terminal. Used for a signal common, as well as providing protection against electrical shock in case of a fault in the instrument. A terminal marked with this symbol must be connected to ground in the manner described in the installation (Operation) manual, and before operating the equipment.



Frame or chassis terminal. A connection to the frame (chassis) of the equipment which normally includes all exposed metal structures.

Alternating current (power line).

Direct current (power line).

Alternating or direct current (power line).

Warning

Warning denotes a hazard. It calls attention to a procedure, practice, condition or the like, which, if not correctly performed or adhered to, could result in *injury* or *death* to personnel.

Caution

Caution sign denotes a hazard. It calls attention to a procedure, practice, condition or the like, which, if not correctly performed or adhered to, could result *damage* to or *destruction* of part or all of the product.

Note

Note denotes important information. It calls attention to a procedure, practice, condition or the like, which is essential to highlight.

Contents

Figures

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1

General Information

Introduction

The purpose of this manual is to enable you to use your 16064B LED Display/Trigger Box efficiently and confidently. This manual contains both general and specific information. To use the 16064B to perform a specific function (without reading the entire manual), follow the directions in "Using the 16064B".

Using the 16064B

The 16064B has been designed to operate specifically with the 4263B LCR Meter, 4338B Milliohmmeter and 4339B High Resistance Meter.

- To install the 16064B, turn to Chapter 2.
- To operate the 16064B, turn to Chapter 3.
- To order replaceable parts for the 16064B, turn to "Replaceable Parts" in Chapter 4.

Product Description

The 16064B has been designed to operate specifically with the 4263B LCR Meter, 4338B Milliohmmeter and 4339B High Resistance Meter. The 16064B has the following four functions:

- To display the results sent from the 4263B, 4338B, and 4339B comparator by LEDs through the handler interface.
- To display an indicator, which shows that the internal protection circuit of the instrument is prohibiting a measurement to avoid erroneous operation.
- To lock out the front panel keys of instrument.
- To trigger a measurement.

Accessories Supplied

The following is a list of the accessories supplied with the 16064B:

Table 1-1. Furnished Accessories

Description	Part Number	Quantity
Operation and Service Manual	P/N 16064-90010	1

Operating and Safety Precautions

Operating

You need observe only normal precautions in handling and operating the 16064B.

Caution

Electrostatic discharge (ESD) can damage the highly sensitive microcircuits in the 16064B LED Display/Trigger Box. ESD damage is most likely to occur as the boxes are connected or disconnected. Protect them by wearing a grounding strap that provides a high resistance path to ground. Alternatively, ground yourself by touching the outer shell of any grounded instrument chassis before touching the test port connectors.

Never touch the center contacts of the connectors.

Use a work station equipped with an anti-static surface.

Service

The voltages levels in this product do not warrant more than normal caution for operator safety. Nevertheless, service should be performed only by qualified personnel.

Specifications

This section lists the complete 16064B specifications. These specifications are the performance standards and limits against which the 16064B is tested. When shipped from the factory, the 16064B meets the specifications listed in this section.

Applicable Instrument	4263B, 4338B, and 4339B
Parameter Displayed	High, In, Lo (primary)
	High, In, Lo (secondary)
	No Contact [1], Over Current [2], Over Voltage (Fail) [3]
Input Signal Controlled	EXT TRG
Maximum VA	5 V, 120 mA max
Cable Length	1.5 m
Operating Temperature	0 to 55°C
Operating Humidity	≤95% RH (@40°C, 24 hours)
Non-operating Temperature	−40 to 70 °C
Non-operating Humidity	≤95% RH (@65°C, 24 hours)
Dimensions	200 mm (W) × 40 mm (H) × 100 mm (D)
Weight	0.8 kg

1 Result of Contact Check function of 4339B and 4263B.

2 This is displayed when the Current Limit function of 4339B detects that the current through the DUT is over the limit.

3 This is displayed when the voltage limit function of 4338B detects that the voltage applied to the DUT is over 20 mV peak.)

2

Preparation for Use

Introduction

This chapter explains how to install the 16064B LED Display/Trigger Box. The topics covered include initial inspection, environment considerations, connecting the cable for use, and repackaging the LED Display/Trigger Box.

Initial Inspection

The LED Display/Trigger Box has been carefully inspected electrically and mechanically before being shipped from the factory. It should be in perfect physical condition, no scratches, dents or the like, and it should be in perfect electrical condition. Verify this by carefully performing an incoming inspection to check the box for signs of physical damage and missing contents. If any discrepancy is found, notify the carrier and Agilent Technologies. Your Agilent Technologies sales office will arrange for repair and replacement without waiting for the claim to be settled.

1. Inspect the shipping container for damage, and keep the shipping materials until the incoming inspection is completed.
2. Verify that the shipping container contains everything shown in Figure 2-1 and listed in Table 2-1.
3. Inspect the exterior of the 16064B for any signs of damage.

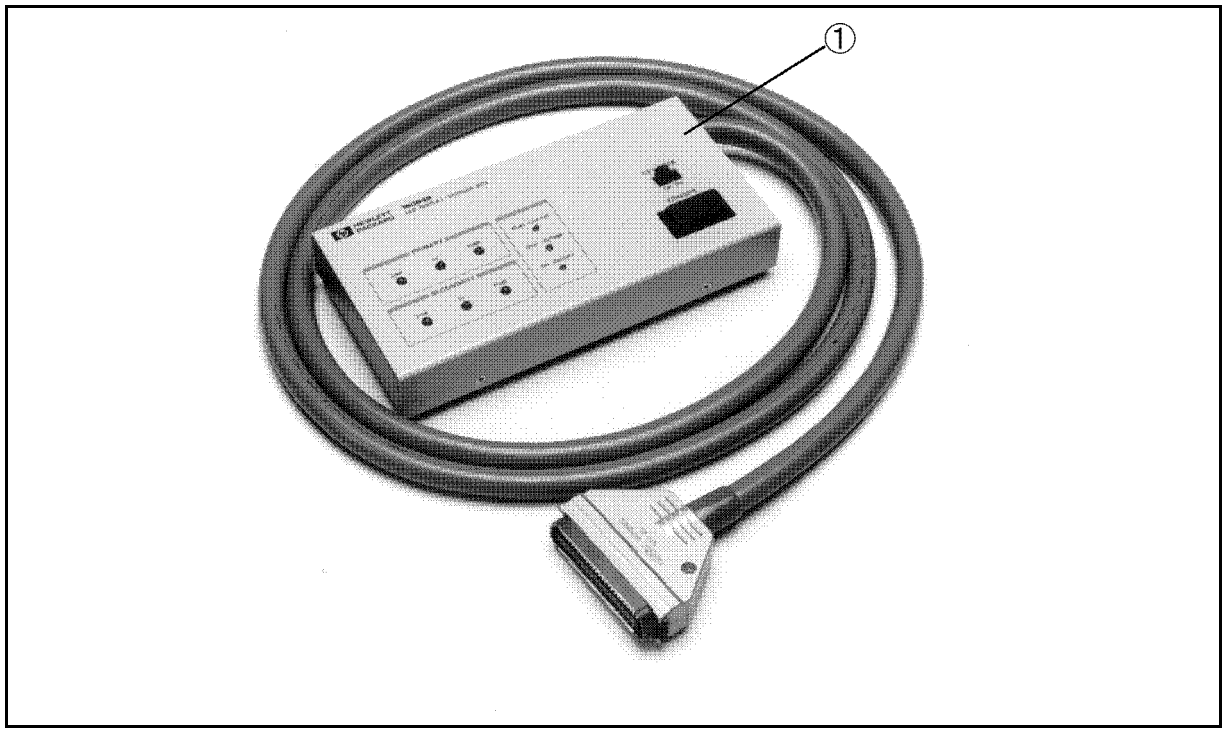

Figure 2-1. Product Overview

Table 2-1. Contents

Description	Agilent Part Number	Quantity
① LED Display/Trigger Box	16064-60003[1]	1
② Operation and Service Manual[2]	16064-90010	1

1 Agilent internal-only part number.

2 Operation and Service Manual is not shown in Figure 2-1.

Environmental Considerations

Operating and Storage

The 16064B should be operated within an ambient temperature range of 0°C to 55°C and relative humidity up to 95% at 40°C (non-condensing).

The 16064B may be stored within a temperature range of −40°C to +70°, and at a relative humidity of up to 95% at +65°C (non-condensing).

Connecting the Box for Use

Note

When 16064B is used, the handler interface of 4263B, 4338B, and 4339B should be the factory setting as follows:

Factory Setting of the Handler Interface

Ext_DCV2 is from 5 volt through 6 volt
No pull-up resistors

See *4263B Operation Manual*, *4338B Operation Manual*, and *4339B Operation Manual* for more information on how to set up the handler interface board.

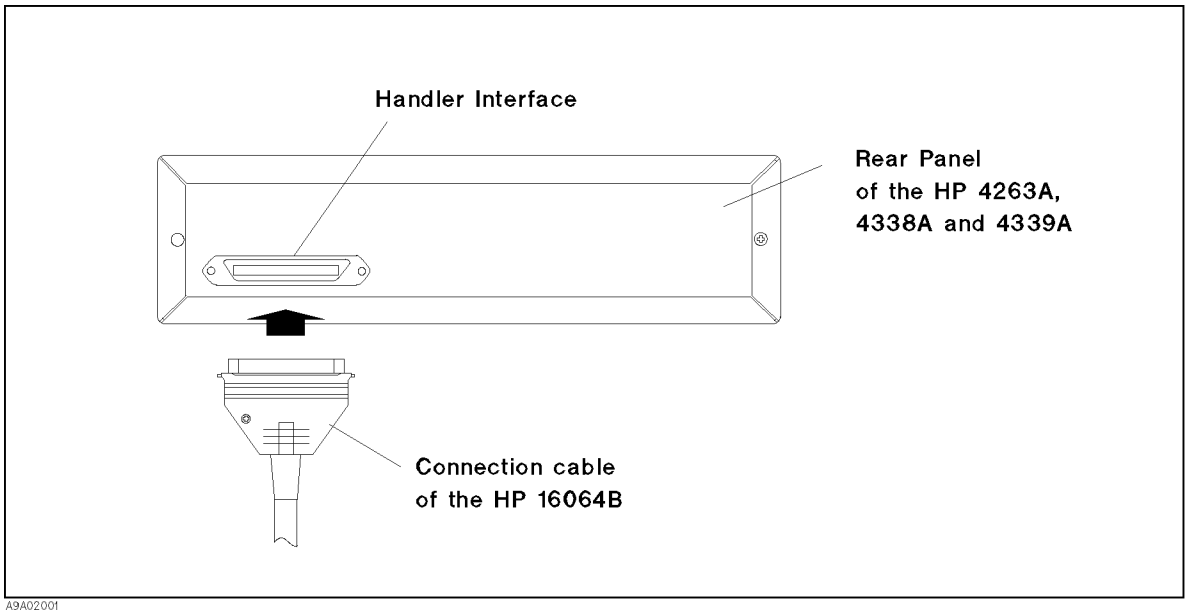

Figure 2-2. Connecting the Cable

Repackaging the LED Display/Trigger Box

If shipping to a Agilent Technologies service center is required, each box should be repackaged using the original factory packaging materials.

Alteratively, comparable packaging materials may be used. Wrap the box in heavy paper and pack in anti-static plastic packing material. Use sufficient shock absorbing material on all sides of the 16064B to provide a thick, firm cushion and to prevent movement. Seal the shipping container securely and mark it *FRAGILE*.

3

Operation

Introduction

This chapter illustrates the features of the 16064B(Figure 3-1) describes what the indicators show, how to lock out the front keys of instrument, and how trigger to a measurement.

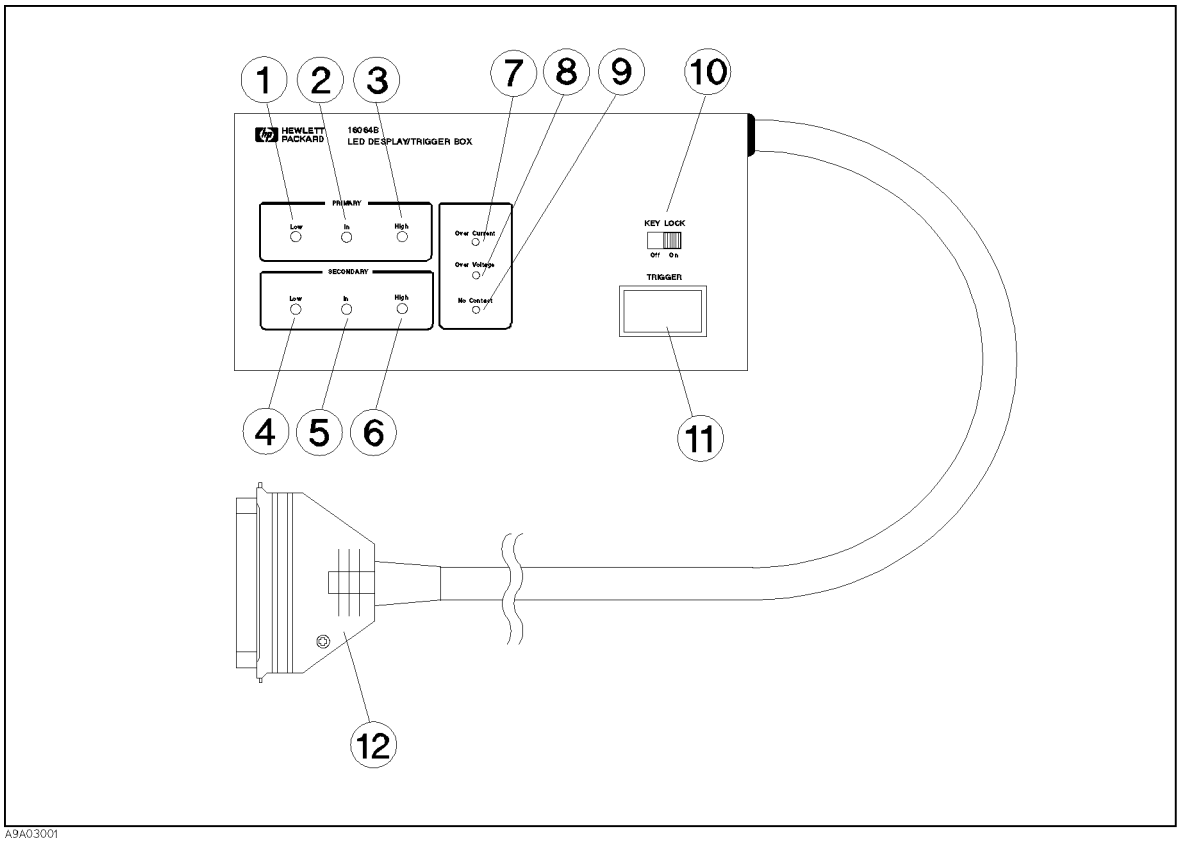

Figure 3-1. 16064B Features

1. *Primary result indicator (LOW).* Turns ON when the primary parameter measurement result, sent from the comparator, is LOW.
2. *Primary result indicator (IN).* Turns ON when the primary parameter measurement result, sent from the comparator, is IN.
3. *Primary result indicator (HIGH).* Turns ON when the primary parameter measurement result, sent from the comparator, is HIGH.
4. *Secondary result indicator (LOW).* Turns ON when the secondary parameter measurement result, sent from the comparator, is LOW.

5. *Secondary result indicator (IN).* Turns ON when the secondary parameter measurement result, sent from the comparator, is IN.
6. *Secondary result indicator (HIGH).* Turns ON when the secondary parameter measurement result, sent from the comparator, is HIGH.
7. *Over current indicator.* Turns ON when the current flowing through the DUT is over the limit and the instrument can not measure the DUT.
8. *Over voltage indicator.* Turns ON when the measurement voltage across the DUT is over the limits and the instrument can not measure the DUT.
9. *No contact indicator.* Turns ON when the contact check function detects a broken cable or a bad connection.
10. *Key lock switch.* Turning this ON disables the front panel key input.
11. *Trigger key.* Pressing this triggers a measurement.

Warning

When the 16064B is connected to the 4339B, DO NOT touch the UNKNOWN connector when you pressing the trigger key. The trigger key causes that the 4339B supplies high voltage up to 1000 Vdc maximum to the UNKNOWN connector when the sequence measurement is turned to ON. The High Voltage Indicator of the 4339B is lit while the high voltage is supplied. You must operate connecting the test fixture to the 4339B after turning off the voltage output and making confirmation of the high voltage indicator is turned OFF.

12. *Connection Cable.* This should be connected to the handler interface terminal on the rear panel of the instrument.

Each instrument connected to 16064B can only use the LED indicators related to the functions that the instrument provides. In the following table, each instrument can use the LED indicators marked by "•".

Table 3-1. Applicable Instrument to the Indicators

LED Indicator	4338B	4339B	4263B
(1) Primary LOW	•	•	•
(2) Primary IN	•	•	•
(3) Primary HIGH	•	•	•
(4) Secondary LOW	•		•
(5) Secondary IN	•		•
(6) Secondary HIGH	•		•
(7) Over Current		•	
(8) Over Voltage	•		
(9) No Contact		•	•

Note

When the Key Lock switch of the 16064B is turned on, front panel key input is disabled even if the Key Lock key on the front panel of the instrument is pressed or the GPIB command `SYST:KLOC OFF` (Key Lock OFF) is sent by GPIB.

Operation

How to Trigger a Measurement form the LED Display/Trigger Box

Warning

When the 16064B is connected to the 4339B, DO NOT touch the UNKNOWN connector when you pressing the trigger key. The trigger key causes that the 4339B supplies high voltage up to 1000 Vdc maximum to the UNKNOWN connector when the sequence measurement is turned to ON. The High Voltage Indicator of the 4339B is lit while the high voltage is supplied. You must operate connecting the test fixture to the 4339B after turning off the voltage output and making confirmation of the high voltage indicator is turned OFF.

1. Set the trigger mode to the EXT Trig mode from the front keys of the instrument.
2. Press the trigger key of the 16064B.

Note

In EXT Trig mode, you can use both the trigger key of 16064B or the EXT Trigger terminal on the rear panel of the instrument to trigger it. The instrument is triggered by a fast pulse input, either from the trigger key of the box or from the EXT Trigger terminal.

How to Use the LED Indicator related to the Comparator

Turn on the comparator function from the front panel key of the instrument.

How to Clear the LED Indicator related to the Comparator

Turn OFF the comparator function using the front panel keys of the instrument.

How to Use the Contact Check LED Indicator

Turn ON the contact check function using the appropriate front panel key of the instrument.

4

Service

Introduction

This chapter gives service information for the 16064B. The Replaceable Parts List and the Schematic Diagram are included.

Replaceable Parts

Figure 4-1 and Table 4-1 identify the replaceable parts. Figure 4-2 and Table 4-2 identify the replaceable parts on the PC board. The parts listed can be ordered from your nearest Agilent Technologies office. Ordering information should include the Agilent Part number and the quantity required.

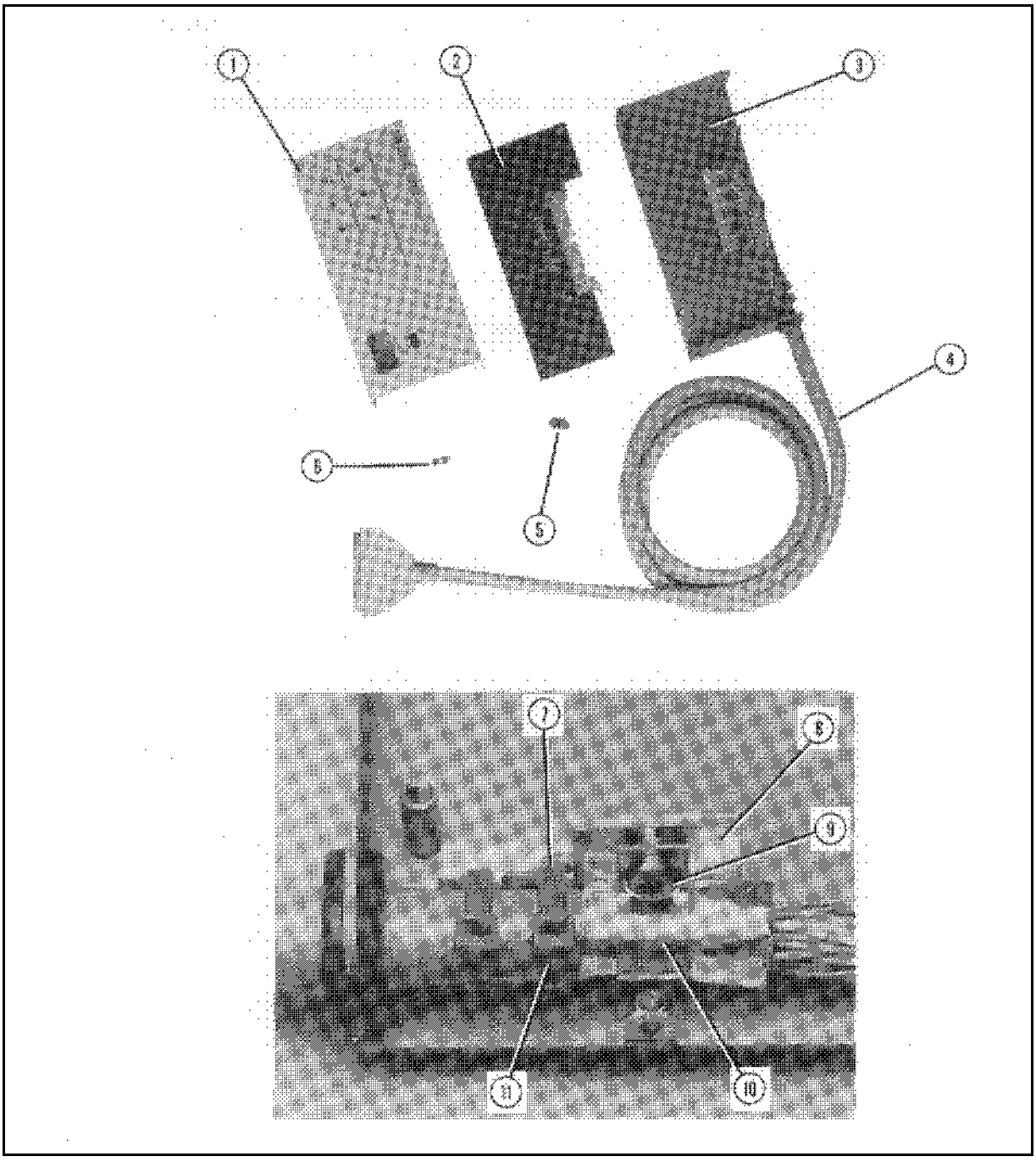

Figure 4-1. Replaceable Parts Identifier

Table 4-1. Replaceable Parts

Reference Designator	Agilent Part Number	Qty.	Description
1	16064-04403	1	Cover Top
2	16064-66503	1	PC Board Assembly
3	16064-04004	1	Cover Bottom
	0403-0424	4	Cushion 20.6×7.6
4	16064-61611	1	Cable Assembly
5	0515-1550	4	Screw Pan Head M3×0.5 L8
6	0515-0914	4	Screw Flat Head M3×0.5 L6
7	0515-0914	2	Screw Flat Head M3×0.5 L6
8	16064-00602	1	Angle
9	0515-2079	1	Screw Pan Head M4 L8
10	1400-0014	1	Cable Clamp
11	1400-0493	1	Cable Tie

Table 4-2. Replaceable Parts on PC Board (1 of 2)

Reference Designator	Agilent Part Number	C D	Qty.	Description
A1	16064-66503	1	1	PC BOARD ASSEMBLY
A1C1	0160-4835	7	1	CAP-FXD 0.1μF ±10% 50 V
A1C2	0160-6561	0	1	CAP-FXD 0.1μF ±20% 50 V
A1C3	0160-6561	0	1	CAP-FXD 0.1μF ±20% 50 V
A1C4	0180-3597	8	1	CAP-FXD 47μF ±20% 25 V
A1C5	0160-4832	4	1	CAP-FXD 0.01μF ±10% 100 V
A1DS1	1990-0534	5	1	LED-LAMP
A1DS2	1990-0521	0	1	LED-LAMP
A1DS3	1990-0534	5	1	LED-LAMP
A1DS4	1990-0534	5	1	LED-LAMP
A1DS5	1990-0521	0	1	LED-LAMP
A1DS6	1990-0534	5	1	LED-LAMP
A1DS7	1990-0487	7	1	LED-LAMP
A1DS8	1990-0487	7	1	LED-LAMP
A1DS9	1990-0487	7	1	LED-LAMP
A1J1	1251-5653	3	1	CONNECTOR-POST TYPE
A1R1	0698-3155	1	1	RESISTOR 4.64K ±1% 0.125W
A1R2	0698-3155	1	1	RESISTOR 4.64K ±1% 0.125W
A1R3	0698-3155	1	1	RESISTOR 4.64K ±1% 0.125W
A1R4	0698-3155	1	1	RESISTOR 4.64K ±1% 0.125W
A1R5	0698-3155	1	1	RESISTOR 4.64K ±1% 0.125W
A1R6	0698-3155	1	1	RESISTOR 4.64K ±1% 0.125W
A1R7	0698-3155	1	1	RESISTOR 4.64K ±1% 0.125W
A1R8	0698-3155	1	1	RESISTOR 4.64K ±1% 0.125W
A1R9	0698-3155	1	1	RESISTOR 4.64K ±1% 0.125W
A1R10	0698-0082	7	1	RESISTOR 464 ±1% 0.125W
A1R11	0698-0082	7	1	RESISTOR 464 ±1% 0.125W
A1R12	0698-0082	7	1	RESISTOR 464 ±1% 0.125W
A1R13	0698-0082	7	1	RESISTOR 464 ±1% 0.125W
A1R14	0698-0082	7	1	RESISTOR 464 ±1% 0.125W
A1R15	0698-0082	7	1	RESISTOR 464 ±1% 0.125W
A1R16	0698-0082	7	1	RESISTOR 464 ±1% 0.125W
A1R17	0698-0082	7	1	RESISTOR 464 ±1% 0.125W
A1R18	0698-0082	7	1	RESISTOR 464 ±1% 0.125W
A1R19	0698-3155	1	1	RESISTOR 4.64K ±1% 0.125W
A1R20	0757-0280	3	1	RESISTOR 1K ±1% 0.125W
A1R21	0698-3454	3	1	RESISTOR 215K ±1% 0.125W

Replaceable Parts on PC Board (2 of 2)

Reference Designator	Agilent Part Number	C D	Qty.	Description
A1SW1	3101-3064	1	1	SWITCH-PUSH
A1SW2	3101-2334	6	1	SWITCH-SLIDE
A1U1	1820-3707	1	1	IC DRVR TTL/ALS BUS OCTL
A1U2	1820-3145	1	1	IC DRVR TTL/ALS BUS OCTL
A1U3	1820-1423	4	1	IC MV TTL/LS MONOSTBL RETRIG DUAL
A1MP1	0371-3804	5	1	KEY CAP “TRIGGER”
A1MP2	94819-04210	4	1	SUPPORT SWITCH
A1MP3	5040-3328	2	6	INSULATOR-LED[1]
A1MP4	5040-3322	6	3	INSULATOR-LED[2]

1 for A1DS1 through A1DS6

2 for A1DS7 through A1DS9

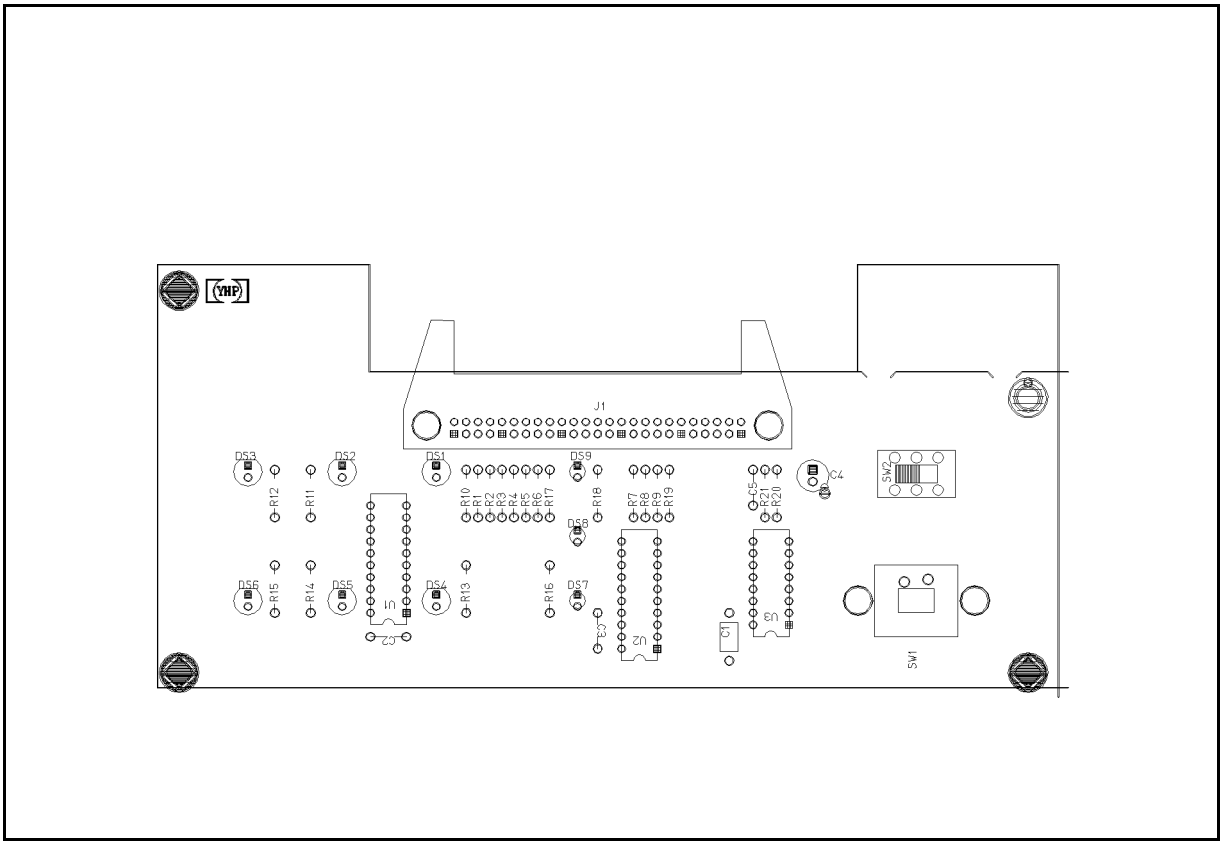

Figure 4-2. Component Locations

Schematic Diagram

Figure 4-3 shows the schematic diagram of the 16064B.

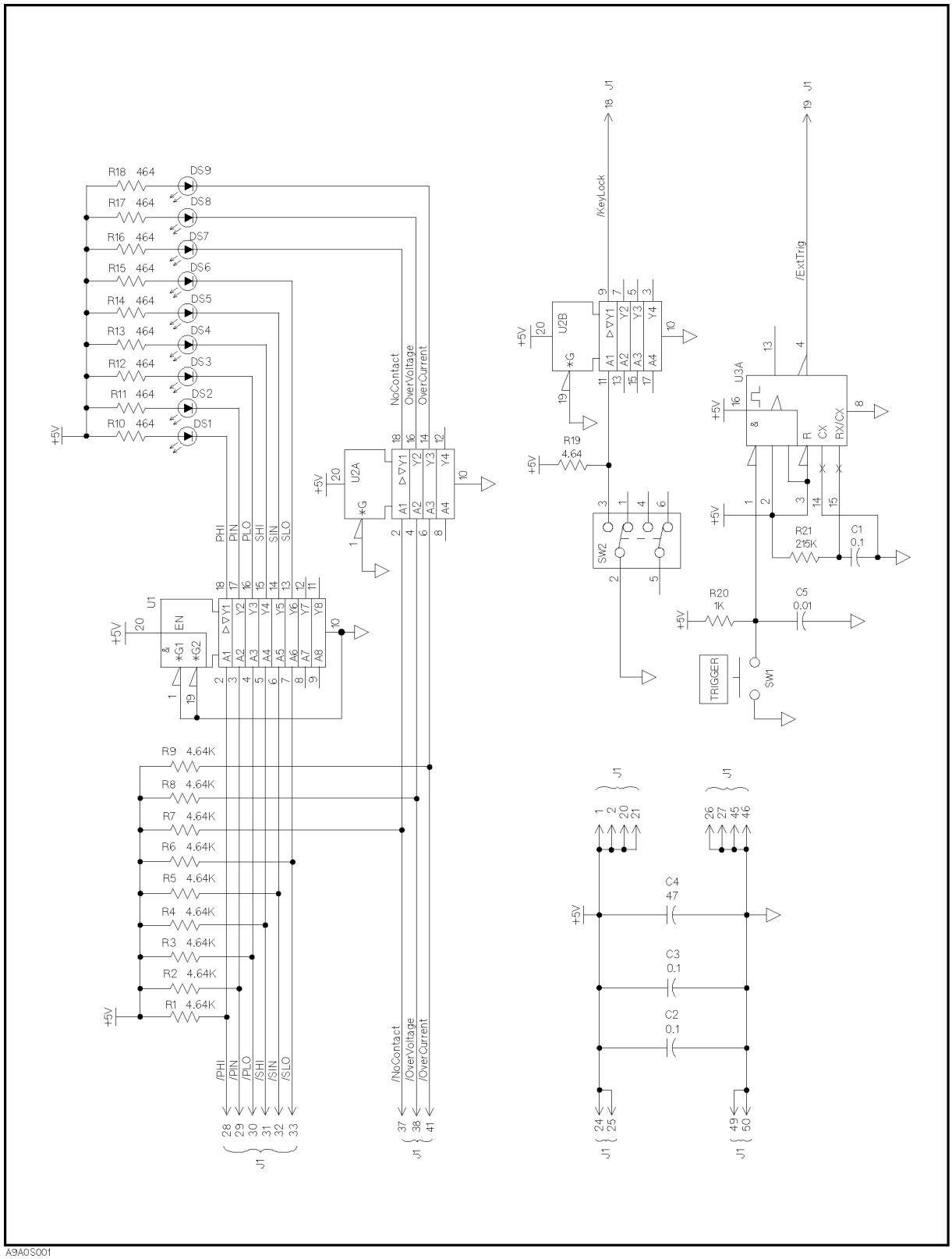

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Figure 4-3. Schematic Diagram

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