

# Keysight Technologies

## E4980AL Precision LCR Meter

20 Hz to 300 kHz/500 kHz/1 MHz

Providing the best combination of accuracy, speed and versatility



## A Standard LCR Meter

Keysight's E4980AL precision LCR meter provides the best combination of accuracy, speed, and versatility for a wide range of component measurements. Offering fast measurement speed and outstanding performance at both low and high impedance ranges, the E4980AL is the basic tool for general R&D and manufacturing test of components and materials.

### Fast measurement speed

The E4980AL offers excellent speed:

- 12 ms (SHORT)<sup>1</sup>
- 118 ms (MED)<sup>1</sup>
- 343 ms (LONG)<sup>1</sup>

### Accurate measurements

Exceptionally low noise at both low and high impedance for evaluating the characteristics of inductors and capacitors with excellent accuracy and repeatability.

- 0.05% basic impedance accuracy
- 1/2/4m cable extension capability
- Open/Short/Load correction

### DC bias

Built-in DC-voltage-bias source provides accurate bias dependency evaluation for C, L, and material measurements.

- 1.5 V and 2 V

### High-resolution LCD display

Full, 7-digit display and 6 display modes for clear and easy viewing.

### Simple and intuitive operation

Easily configure measurements with soft keys (same interface as Keysight's 4284A LCR meter), one-touch front panel keys and an intuitive user interface.

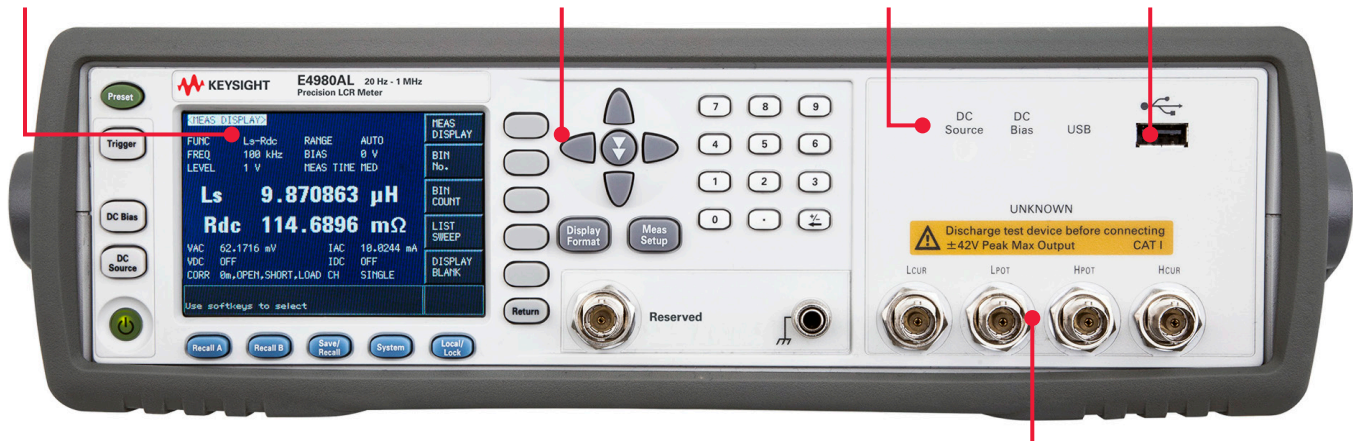
### LED status lights

Conveniently view DC bias and USB memory status.

### USB interface

(memory devices only)

Easily save measurement states, data logs, and screen captures to USB memory devices.



### 100 µV to 2 Vrms variable test signals

Provides signal levels to evaluate the AC voltage characteristics of your devices.

1. Measurement time at 1 MHz. Supplemental information. For additional details, refer to the E4980A/E4980AL data sheet (literature number 5989-4435EN).

## Key Features

### Accurate measurements

Exceptionally low noise at both low and high impedance to improve test quality.

- 0.05 % basic impedance accuracy
- Open/Short/Load compensation support
- Cable extension (1/2/4m) support

### Fast measurement speed<sup>1</sup>

Fast speed provides more throughput reducing cost of test.

- 12 ms (SHORT)
- 118 ms (MED)
- 343 ms (LONG)

### Measurement versatility

- 20 Hz to 300 kHz/500 kHz/1 MHz test frequency with 4-digit resolution at any frequency
- 16 impedance parameters
- 100  $\mu$ V to 2 Vrms, 1  $\mu$ A to 20 mA variable test signal
- Auto-level control
- 201 points of programmable list sweep
- DC resistance

### Compact and light weight

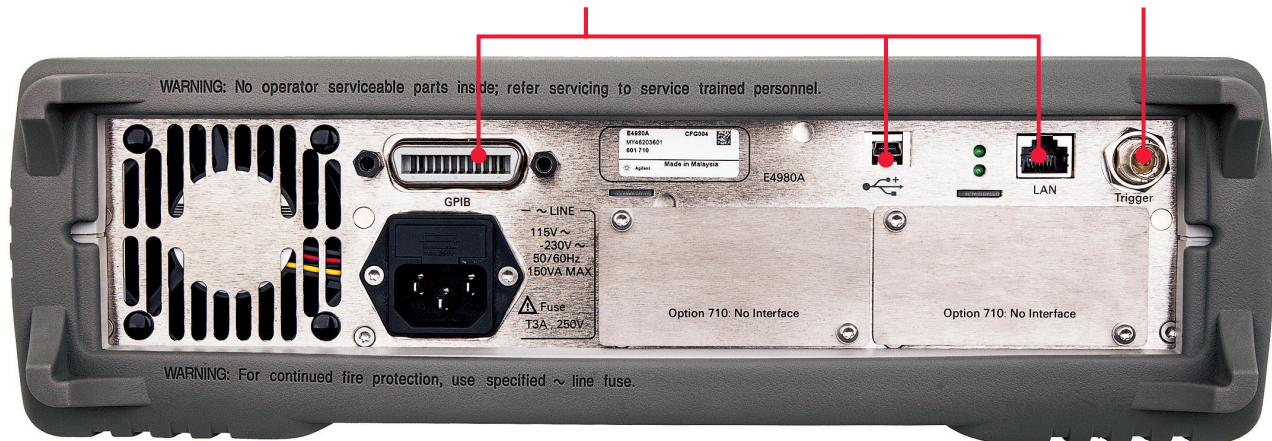
- Small size for easy transportation
- 370 (W) x 105 (H) x 390 (D) mm
  - 5.3 kg (11.7 lb.)

### Standard LAN/USB/GPIB interface

Flexible PC connectivity and fast transfer speed

- 10/100 Base-T LAN
- USB (USBTMC) interface
- GPIB for robust instrument control and test automation

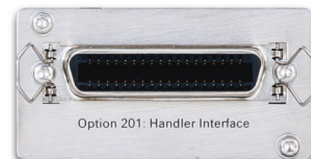
### External trigger



### Optional handler and scanner interfaces

Two interface options to choose from:

- Handler interface with 9 BIN outputs (Option E4980AL-201)
- Scanner interface with 128 multi-channel correction (Option E4980AL-301)



1. Measurement time at 1 MHz. Supplemental information. For additional details, refer to the E4980A/E4980AL data sheet (literature number 5989-4435EN).

## Accurate, Fast Measurements up to 300 kHz/500 kHz/1 MHz

### Accurate measurements provide design and test confidence

#### Broad range impedance measurements

The E4980AL LCR meter offers excellent performance for all impedance measurements.

Reliable measurement performance is needed to meet the test requirements of today's latest devices. The E4980AL offers fast measurement speed and outstanding performance within "both" low and high impedance ranges with exceptional dissipation factor accuracy.

#### Stable small ESR/low impedance measurements

The equivalent series resistance (ESR) of capacitors is becoming smaller and smaller to meet high-speed and low power-consumption circuit needs; and is difficult to measure. The E4980AL provides exceptional measurement stability.

#### Exceptionally accurate, high impedance measurements

The capacitance values of chip-capacitors are now down to femto-farad (fF) range. Thus, very stable and accurate high impedance measurements are required for higher yields and design reliability. Surpassing Agilent's previous industry-standard LCR meter (4284A), the E4980AL further improves measurement stability for these small capacitance devices.

### Offering the industry's best combination of speed and accuracy

Fast measurement speed for more throughput in manufacturing

- 12 ms per point at 1 MHz with SHORT mode<sup>1</sup>
- 118 ms per point at 1 MHz with MED mode<sup>1</sup>
- 343 ms per point at 1 MHz with LONG mode<sup>1</sup>

#### Average function (up to 256)

Enables users to improve measurement repeatability.

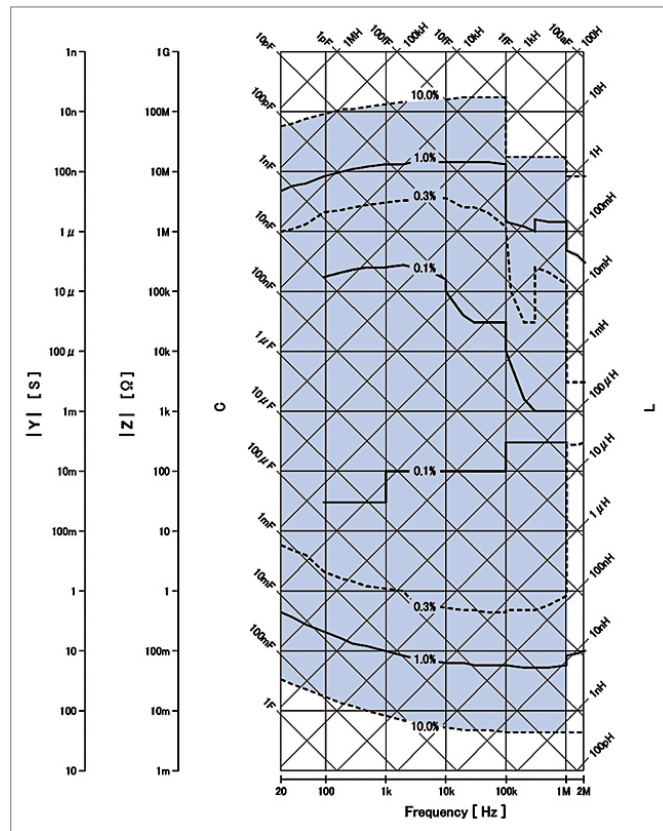


Figure 1. 10% impedance measurement accuracy range. Test signal 1 Vrms, MED mode, cable 0m<sup>2</sup>

1. Measurement time at 1 MHz. Supplemental information. For additional details, refer to the E4980A/E4980AL data sheet (literature number 5989-4435EN).  
 2. Applied up to 300 kHz/500 kHz/1 MHz for E4980AL.



## Versatile Measurement Capability to Meet your Application Needs

Powerful features increase test reliability and efficiency

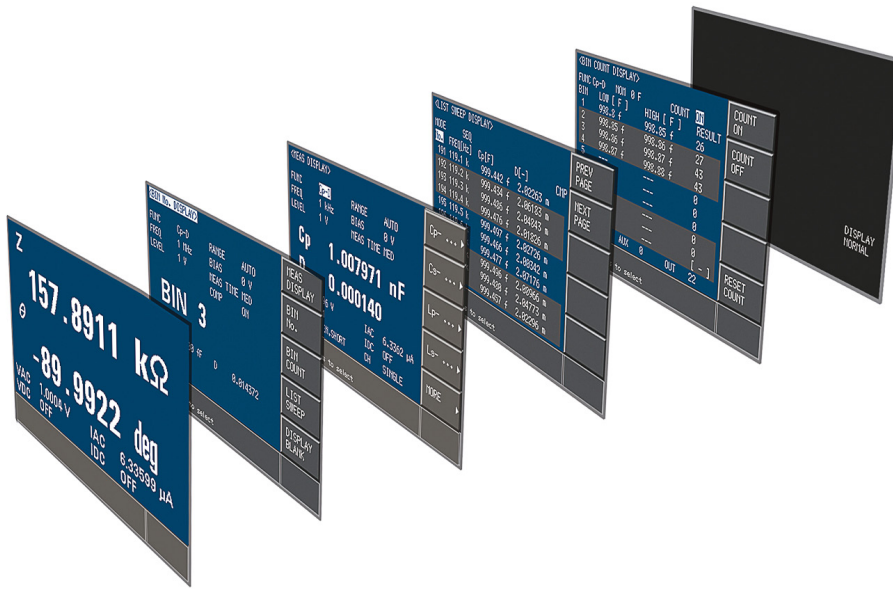


Figure 2. Select one of six display modes

| <LIST SWEEP DISPLAY>   |          |           |           |     |  |
|------------------------|----------|-----------|-----------|-----|--|
| MODE                   | SEQ      |           |           |     |  |
| No.                    | FREQ[Hz] | Cp[F]     | D[-]      | CHP |  |
| 191                    | 119.1 k  | 999.442 f | 2.02263 m |     |  |
| 192                    | 119.2 k  | 999.434 f | 2.06183 m |     |  |
| 193                    | 119.3 k  | 999.486 f | 2.04843 m |     |  |
| 194                    | 119.4 k  | 999.476 f | 2.01826 m |     |  |
| 195                    | 119.5 k  | 999.497 f | 2.02726 m |     |  |
| 196                    | 119.6 k  | 999.466 f | 2.08342 m |     |  |
| 197                    | 119.7 k  | 999.477 f | 2.07176 m |     |  |
| 198                    | 119.8 k  | 999.496 f | 2.08966 m |     |  |
| 199                    | 119.9 k  | 999.488 f | 2.04773 m |     |  |
| 200                    | 120 k    | 999.457 f | 2.02296 m |     |  |
| Use Softkeys to select |          |           |           |     |  |

Figure 3. List sweep mode

| <MEAS DISPLAY>         |            |           |            | MEAS DISPLAY  |
|------------------------|------------|-----------|------------|---------------|
| FUNC                   | Ls-Rdc     | RANGE     | AUTO       |               |
| FREQ                   | 1 MHz      | BIAS      | 0 V        | BIN No.       |
| LEVEL                  | 1 V        | MEAS TIME | MED        | BIN COUNT     |
| Ls 5.631952 nH         |            |           |            | LIST SWEEP    |
| Rdc 100.4456 mΩ        |            |           |            | DISPLAY BLANK |
| VAC                    | 1.10536 mV | IAC       | 10.0402 mA |               |
| VDC                    | ---        | IDC       | ---        |               |
| CORR                   | 0m, OPEN   | CH        | ---        |               |
| Use Softkeys to select |            |           |            |               |

Figure 4. DCR measurement

### Six convenient display modes

Select one of six display modes to suit your particular measurement needs.

- **Normal** view for a data overview
- **Large display** view for enhanced readability
- **BIN No.** view for measurement comparison and device sorting
- **BIN count** view for statistical evaluation
- **LIST sweep** view for continuous data
- **Blank page** view for ultimate speed (Turns off display to save refresh time.)

### 201 points list sweep

Frequency, measurement range, and stimulus conditions, can be set as list parameters (max 201 points). You can choose two parameters independently to test under a variety of measurement conditions.

### DC resistance measurement

For inductor measurements, Ls or Lp and Rdc parameters can be measured at the same time.

## Exceeding Expectations in Productivity

### Support for a wide variety of test fixtures

The E4980AL can be used with over twenty fixtures to meet a variety of evaluation needs; from materials to SMD components. Also, built-in compensation functions minimize the influence of test fixtures.

### USB memory support

The front panel USB memory interface allows you to quickly and easily save state files, measurement log data, and display images to an external USB memory device (mass storage).

### PC connectivity

Standard GPIB/LAN/USB control interfaces provide a variety of paths for controlling the instrument. Using a LAN cable, you can even control the E4980AL with a computer and Web browser.

### Scanner or handler interface options

The E4980AL offers an optically-isolated 9-BIN handler (Option 201) for integration into handler systems. A 128-channel scanner interface (Option 301) facilitates applications requiring a component scanner. Both interfaces have standard compatibility with other LCR system instruments (e.g. 4284A/88A/78A, etc.) for easy integration into systems. The multi-compensation function enables open/short/load compensations to perform scanning measurements independently in each scanner channel. This minimizes inconsistency in measured values between channels for more accurate measurements throughout the scanner system.

### Materials measurements with N1500A measurement suite

The N1500A Option 006 supports the E4980AL with the 16451B and 16452A for materials measurements. The N1500A's easy-to-use user interface for calibration, limit test, and report generation functions provide versatility when making materials measurements. The N1500A can run on an external PC.

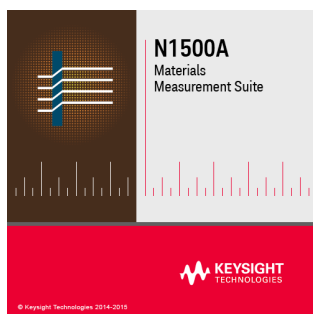


Figure 5. The E4980AL LCR meter offers support for a wide variety of test fixtures



Figure 6. Example of use with USB storage device



Figure 7. The E4980AL LCR meter can conveniently be controlled over LAN with a computer and a Web browser

### Upgradability

Following upgrade options are available.

- E4980ALU-050 or 052: 300 kHz to 500 kHz
- E4980ALU-110 or 112: 300 kHz to 1 MHz
- E4980ALU-111 or 113: 500 kHz to 1 MHz
- E4980ALU-201 or 211: Add handler interface
- E4980ALU-301 or 311: Add scanner interface

Refer to the configuration guide for more details.

## Quick Product Comparison


**4263B LCR meter (Discontinued)**

**E4980AL Precision LCR meter**

**E4980A Precision LCR meter**

|                          | <b>4263B LCR meter (Discontinued)</b>  | <b>E4980AL Precision LCR meter</b>                             | <b>E4980A Precision LCR meter</b>                                            |
|--------------------------|----------------------------------------|----------------------------------------------------------------|------------------------------------------------------------------------------|
| Frequency                | 100, 120, 1 k, 10 k, 20 k, and 100 kHz | 20 Hz to 300 k/500 k/1 MHz                                     | 20 Hz to 2 MHz                                                               |
| Test signal level        | 20 m to 1 Vrms                         | 0 to 2 Vrms/0 to 20 mArms                                      | 0 to 2 Vrms or 20 Vrms (Option 001) /0 to 20 mArms or 100 mArms (Option 001) |
| Auto level control (ALC) | No                                     | Yes                                                            | Yes                                                                          |
| DC bias capability       | 1.5 V, 2 V                             | Built-in 1.5 V, 2 V                                            | 1.5 V, 2 V or $\pm 40$ V (Opt. 001)                                          |
| Programmable list sweep  | No                                     | 201 points                                                     | 201 points                                                                   |
| Remote control           | GPIB                                   | GPIB, LAN, USB                                                 | GPIB, LAN, USB                                                               |
| Web browser control      | No                                     | Yes                                                            | Yes                                                                          |
| Interface option         | Handler                                | Handler (Option 201) / Scanner (Option 301)                    | Handler (Option 201) / Scanner (Option 301)                                  |
| Parameters               | Impedance, DCR, N, M                   | Impedance, DCR                                                 | Impedance, DCR (Option 200)                                                  |
| Control commands         | 4263B unique                           | E4980A/4284A compatible                                        | E4980A/4284A compatible                                                      |
| Basic accuracy           | 0.1% @ Medium                          | 0.1% @ Short<br>0.05% @ MED/LONG                               | 0.1% @ Short<br>0.05% @ MED/LONG                                             |
| Measurement time mode    | 25 ms Short mode, 65 ms Medium mode    | 149 ms @ 100 Hz<br>26 ms @ 1 kHz<br>12 ms @ 1MHz<br>Short mode | 100 ms @ 100 Hz<br>20 ms @ 1 kHz<br>5.6 ms @1 MHz<br>Short mode              |
| Storage devices          | Internal                               | Internal/USB memory                                            | Internal/USB memory                                                          |
| Cable length             | 0, 1, 2, 4 m                           | 0, 1, 2, 4 m                                                   | 0, 1, 2, 4 m                                                                 |
| Cabinet dimensions (mm)  | 320 (W) x 100 (H) x 300 (D)            | 370 (W) x 105 (H) x 390 (D)                                    | 370 (W) x 105 (H) x 390 (D)                                                  |
| Weight                   | 4.5 kg                                 | 5.3 kg                                                         | 5.3 kg                                                                       |

## Ordering Information

|         |                                                     |
|---------|-----------------------------------------------------|
| E4980AL | Precision LCR Meter, 20 Hz to 300 kHz/500 kHz/1 MHz |
|---------|-----------------------------------------------------|

## Options

| Model       | Description                           |
|-------------|---------------------------------------|
| E4980AL-032 | 20 Hz to 300 kHz with DCR Measurement |
| E4980AL-052 | 20 Hz to 500 kHz with DCR Measurement |
| E4980AL-102 | 20 Hz to 1 MHz with DCR Measurement   |
| E4980AL-201 | Handler interface                     |
| E4980AL-301 | Scanner interface                     |
| E4980AL-1CM | Rack mount kit                        |
| E4980AL-ABA | English localization                  |
| E4980AL-ABJ | Japanese localization                 |
| E4980AL-1A7 | ISO 17025 compliant calibration       |
| E4980AL-A6J | ANSI Z540 compliant calibration       |

For more details on the option configuration, refer to the E4980A/E4980AL configuration guide (literature number 5989-8321EN).

## Upgrade options

| Model               | Description                                     |
|---------------------|-------------------------------------------------|
| E4980ALU-050 or 052 | Upgrade from 300 kHz to 500 kHz for E4980AL-032 |
| E4980ALU-110 or 112 | Upgrade from 300 kHz to 1 MHz for E4980AL-032   |
| E4980ALU-111 or 113 | Upgrade from 500 kHz to 1 MHz for E4980AL-052   |
| E4980ALU-201 or 211 | Handler interface                               |
| E4980ALU-301 or 311 | Scanner interface                               |
| 1CM019A             | Rack mount kit                                  |

Refer to the configuration guide for more details.

## Web Resources

Visit our E4980AL Web site for additional product information and literature.

[www.keysight.com/find/E4980AL](http://www.keysight.com/find/E4980AL)

LCR Meters & Impedance Measurement Products

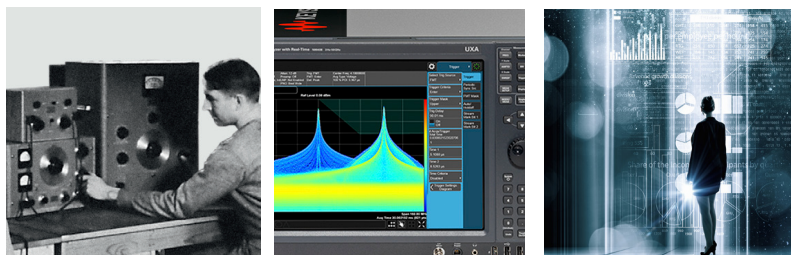
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Published in USA, February 12, 2018  
5991-2305EN  
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