

# DIGITAL MULTIMETERS

Designed to save time and reduce headaches, Tektronix and Keithley Digital Multimeters are built to do more so you don't have to. Each one is loaded with time-saving features like automated measurements, built-in analysis modes and front-panel shortcut buttons. Keithley's highly regarded high performance digital multimeters (DMMs) include 7½ or 8½-digit solutions as well as flexible broad-purpose DMMs.



	2110	DMM4020	2000, 2100	DMM7510	DMM4040/4050	2001, 2010	2002
<b>Resolution</b>	5½ digit	5½ digit	6½ digit	7½ digit	6½ digit	7½ digit	8½ digit
<b>Basic Accuracy</b>	0.012%	0.015%	0.0038% (2100) 0.0030% (2000)	0.0014%	0.0035% (DMM4040) 0.0024% (DMM4050)	0.0024%	0.0010%
<b>Optional Switch Functions</b>	Not Applicable	Not Applicable	10 Channel (2000)	Future	Not Applicable	10 Channel	10 Channel
<b>Interface</b>	USB-TMC GPIB Option	RS-232, RS-232 to USB Device Adapter Included	GPIB, RS-232 (2000) USB-TMC (2100)	GPIB, USB Device-TMC, Ethernet-LXI, USB-Host	USB host, RS-232, GPIB, Ethernet, RS-232 to USB Device Adapter Included	GPIB, RS-232 (2010) GPIB (2001)	GPIB
<b>Software</b>	KI-Tool and KI-Link Startup Software, LabVIEW and IVI drivers. Available at <a href="http://tek.com/keithley">tek.com/keithley</a>	—	KI-Tool and KI-Link Startup Software (2100 only), LabVIEW and IVI drivers. Available at <a href="http://tek.com/keithley">tek.com/keithley</a>	KickStart Instrument Control Software, LabVIEW, IVI-COM/IVI-C, drivers, Keithley LXI Discovery Browser, Test Script Builder	—	LabVIEW Driver	LabVIEW Driver

## CHOOSING YOUR DIGITAL MULTIMETER

To help you choose the appropriate digital multimeter for your application, the most common selection criteria are listed below.

### 1 Resolution

Resolution refers to how fine a measurement a meter can make. By knowing the resolution of a meter, you can determine if it is possible to see a small change in your signal. The terms digits and counts are used to describe a meter's resolution. A 6.5-digit multimeter can display 6 full digits ranging from 0 to 9, and one "half" digit, which displays only a 1 or is left blank. A 6.5-digit meter will display up to 1,999,999 counts of resolution.

### 2 Accuracy

Accuracy is the largest allowable error that will occur under specific operating conditions. In other words, it is an indication of how close the DMM's displayed measurement is to the actual value of the signal being measured. Accuracy is usually expressed as a percent of reading. An accuracy of one percent of reading means that for a displayed reading of 100 volts, the actual value of the voltage could be anywhere between 99 volts and 101 volts.

### 3 Measurements

Digital multimeters are capable of making a variety of different measurements. A basic DMM typically can measure voltage, current and resistance. Other measurements commonly supported are continuity and diode measurements. Continuity is a quick go/no-go resistance test that distinguishes between an open and a closed circuit. A diode test mode measures the actual voltage drop across a junction. Other possible measurement modes are frequency, period, temperature and capacitance.

### 4 Extra Channel Capacity

Many of Keithley's DMMs include the capability to add a scanner accessory, enabling measurements on multiple test points or devices.



## Models 2000, 2100, 2110

These cost-effective, high precision instruments offer 5.5- and 6.5-digit accuracy and are ideal for a wide range of manual, semi-automatic, and production test applications. They can be used as stand-alone benchtop instruments and as components in test systems.

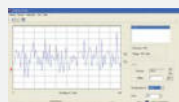
DATA SHEET 2000

DATA SHEET 2100

DATA SHEET 2110

### PRODUCT HIGHLIGHTS

- Exceptional 6½-digit measurement integrity with high speed throughput (Model 2000)
- Built-in slot for scanner card (Model 2000)
- 15 built-in measurement functions including thermocouples (Model 2110)
- Full featured DMMs at a value price
- USB Test and Measurement Class (USBTMC) interface (Models 2110 and 2100)



The KI-Tool application for the Model 2100 provides charting and graphing capabilities without programming.



For multipoint measurement, plug a scanner card into the Model 2000.

MODEL	RESOLUTION	BASIC V DC ACCURACY, 1 YEAR (% READING + % RANGE)	MEASUREMENTS	INTERFACE
2000	6½	0.0030 + 0.0005	Vac, Vdc, Idc, Iac, 2WΩ, 4WΩ, Temp, Freq, Period, dB, dBm, Cont., Diode	GPIB, RS-232
2100	6½	0.0038 + 0.0006	Vac, Vdc, Idc, Iac, 2WΩ, 4WΩ, Temp, Freq, Period, Cont., Diode	USB
2110	5½	0.012 + 0.002	Vac, Vdc, Idc, Iac, 2WΩ, 4WΩ, Temp, Freq, Period, dB, dBm, Cont., Diode, Cap., Therm.	USB (GPIB Option)

### RECOMMENDED ACCESSORIES

2000-SCAN	10-channel Scanner Card (Model 2000)
2001-SCAN	10-channel Scanner Card with Two High-speed channels (Model 2000)
2001-TSCAN	9-channel Thermocouple Scanner Card (Model 2000)
5808	Low cost, Single Pin, Kelvin Probes
5805	Kelvin Probes, 0.9m (3ft)
5805-12	Kelvin Probes, 3.6m (12ft)
5809	Low Cost, Kelvin Clip Lead Set

### RECOMMENDED ACCESSORIES

7007-1	Shielded GPIB Cable, 1m (3.3ft)
7007-2	Shielded GPIB Cable, 2m (6.6ft)
KPCI-488LPA	IEEE-488 Interface/Controller for the PCI Bus
KUSB-488B	IEEE-488 USB to GPIB Interface Adapter
4288-1	Single Fixed Rack Mount Kit (Model 2000, 2100)
4299-3	Single Rack Mount Kit (Model 2100 and 2110)
4299-4	Dual Rack Mount Kit (Model 2100 and 2110)

### SHIPS WITH PRODUCT

- Safety Test Leads
- User Documentation
- USB Cable (Models 2100/2110)
- KI Tool and KI Link Software (Models 2100/2110)
- Calibration Certificate
- Power Cord
- 1-year Warranty
- 3-year Warranty (Model 2110)

## LEARN MORE

with the “Using the Dual Measurement Functionality and Dual Measurement Display on the Keithley Model 2110 5½-Digit Dual-Display Digital Multimeter” Application Note.





## Models 2001, 2002, 2010

Each Model 2001, 2002, and 2010 digital multimeter (DMM) offers superior measurement precision, sensitivity, and traceability. They also support plug-in scanner cards that allow you to quickly and economically create multi-channel measurement systems.

DATA SHEET 2001 2002

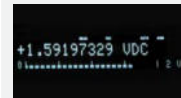
DATA SHEET 2010

### PRODUCT HIGHLIGHTS

- Measurement functions include temperature, 4-wire resistance, peak detection, low ohms, and Keysight 3458A emulation (Model 2002)
- Built-in slot for scanner card
- Multiple measurement display (Models 2001 and 2002)
- Dry circuit measure function limits test voltage when testing contact or connector resistances (Model 2010)



Add a plug-in scanner card to turn any of these DMMs into a complete scan and measure system.



Use the multiple display capability (Model 2001/2002) to simultaneously display different aspects of one signal.

MODEL	RESOLUTION	BASIC V DC ACCURACY, 1 YEAR (% READING + % RANGE)	MEASUREMENTS	INTERFACE
2001	7½	0.0024 + 0.0004	Vac, Vdc, Idc, Iac, 2WΩ, 4WΩ, Temp, Freq, Period, Crest, Peak	GPIB
2002	8½	0.0010 + 0.00015	Vac, Vdc, Idc, Iac, 2WΩ, 4WΩ, Temp, Freq, Period, Crest, Peak	GPIB
2010	7½	0.0024 + 0.0004	Vac, Vdc, Idc, Iac, 2WΩ, 4WΩ, Temp, Freq, Period, Cont., Diode, Therm., Dry Circ. Ω, Ratio	GPIB, RS-232

### RECOMMENDED ACCESSORIES

2000-SCAN	10-channel Scanner Card
2001-SCAN	10-channel Scanner Card with Two Highspeed Channels
2001-TSCAN	9-channel Thermocouple Scanner Card
5805	Kelvin Probes, 0.9m (3ft)
5805-12	Kelvin Probes, 3.6m (12ft)
5808	Low Cost, Single Pin, Kelvin Probes

### RECOMMENDED ACCESSORIES

5809	Low Cost, Kelvin Clip Lead Set
7007-1	Shielded GPIB Cable, 1m (3.3ft)
7007-2	Shielded GPIB Cable, 2m (6.6ft)
KPCI-488LPA	IEEE-488 Interface/Controller for the PCI Bus
KUSB-488B	IEEE-488 USB to GPIB Interface Adapter
4288-1	Single Fixed Rack Mount Kit

### SHIPS WITH PRODUCT

- Model 8605 High Performance Modular Test Leads (Models 2001, 2002)
- Model 1751 Safety Test Leads (Model 2010)
- Calibration Data (Models 2001, 2002)
- Calibration Certificate (Model 2010)
- Quick Reference Guide
- User Manual, Service Manual
- Power Cord
- 1-year Warranty

## LEARN MORE

about "Peak Detection with the Model 2001 DMM."





PRODUCT HIGHLIGHTS

- Precision multimeter with 3½- to 7½-digit resolution
- 100mV, 1Ω, and 10µA ranges offer the sensitivity needed for measuring low level signals such as sleep mode current
- Capture and display waveforms such as current drain waveforms, or transients with 1MS/sec digitizer
- Large internal memory buffer; store over 11 million readings in standard mode or 27.5 million in compact mode
- Display more with five-inch, high resolution touchscreen interface
- Extensive software available including: Test Script Builder, KickStart Instrument Control Software, and LabVIEW and IVI Drivers (available at tek.com/keithley)



The high speed digitizing function allows capturing and displaying voltage and current waveforms.



## DMM7510 7½-Digit Graphical Sampling Multimeter

The DMM7510 combines all the advantages of a precision digital multimeter, a graphical touchscreen display, and a high speed, high resolution digitizer to create an industry first: a graphical sampling multimeter. The digitizer gives the Model DMM7510 unprecedented signal analysis flexibility; the five-inch capacitive touchscreen display makes it easy to observe, interact with, and explore measurements with “pinch and zoom” simplicity. This combination of high performance and high ease of use offers unparalleled insight into your test results.

MODEL	RESOLUTION	BASIC V DC ACCURACY, 1 YEAR (% READING + % RANGE)	MEASUREMENTS	INTERFACE
DMM7510	7 ½	0.0014 + 0.00012	Vac, Vdc, Idc, Iac, 2WΩ, 4WΩ, Temp, Freq, Period, Cont., Diode, Ratio, Cap, Digitize V, Digitize I	GPIB, USB-TMC, LAN-LXI

### RECOMMENDED ACCESSORIES

#### Test Leads and Probes

1754	2-Wire Universal 10-Piece Test Lead Kit
1756	General Purpose Test Lead Kit
5804	Kelvin (4-Wire) Universal 10-Piece Test Lead Kit
5805	Kelvin (4-Wire) Spring-Loaded Probes
5806	Kelvin Clip Lead Set
5808	Low Cost Single-pin Kelvin Probe Set
5809	Low Cost Kelvin Clip Lead Set
8606	High Performance Modular Probe Kit
8610	Low Thermal Shorting Plug

CA-180-3A LAN Crossover Cable (3 m)

#### Replacement Fuse

DMM7510-FUSE-10A	11A Current Fuse For DMM7510
DMM7510-FUSE-3A	3.5A Current Fuse For DMM7510

### RECOMMENDED ACCESSORIES

#### Communication Interfaces & Cables

KPCI-488LPA	IEEE-488 Interface for PCI Bus
KUSB-488B	IEEE-488 USB-to-GPIB Interface Adapter
7007-x	Shielded GPIB Cable
CA-180-3A	CAT5 Crossover Cable for TSP-Link / Ethernet

USB-B-1 USB Cable, Type A to Type B, 1m (3.3 ft)

#### Triggering and Control

2450-TLINK	DB-9 to Trigger Link Connector Adapter
8501-x	Trigger Link Cable, DIN-to-DIN, 1m or 2m
8503	DIN-to-BNC Trigger Cable

### SHIPS WITH PRODUCT

- 1756 Test Leads
- USB-B-1 USB Cable, Type A to Type B, 1m (3.3 ft)
- 174694600 TSP-Link/Ethernet Cable (1.5 m)
- User Documentation
- DMM7510 QuickStart Guide
- Calibration Certificate
- Power Cord
- 1-Year Warranty
- Test Script Builder Software (available at www.tek.com)
- KickStart Instrument Control Software (available at www.tek.com)
- LabVIEW® and IVI Drivers (available at www.tek.com)

LEARN MORE with the “Measuring Ultra-Low Power Using the Model DMM7510 7½-Digit Graphical Sampling Multimeter.”





## DMM4020

Make measurements, not compromises. Measure a variety of parameters— from volts, ohms and amps to frequency— with one instrument. Save time with front-panel shortcut keys and built-in limit testing. Performance. Reliability. Legendary ease of use. One instrument. Looks like you can have it all.

MODELS	DISPLAY	RESOLUTION (DIGITS)	MEASUREMENTS	BASIC V DC ACCURACY (% READING + % RANGE)
DMM4020	Dual; Numeric	5.5	$V_{AC}$ , $V_{DC}$ , $I_{DC}$ , $I_{AC}$ , $\Omega$ , Cont, Diode, Freq	0.015 + 0.004 (yr.)

### RECOMMENDED TEST LEADS

#### Test Leads

196-3520-xx	Premium Test Leads (TL710 replacement/spare)
TL705	2x4 Wire Ohm 1000V Test Lead
TL725	2x4 Wire Ohm SMD Test Tweezers

### RECOMMENDED ACCESSORIES

#### Accessories

ACD4000	Soft Carrying Case
HCTEK-4321	Hard Carrying Case
RMU2U	Rackmount Kit
013-0369-xx	Calibration Fixture 4-terminal short

### RECOMMENDED SERVICE

SILV100	5-year Extended Warranty
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DATA SHEET



VIRTUAL TOUR



360° VIEW

### PRODUCT HIGHLIGHTS

- 5.5 digit resolution
- Basic V dc accuracy of up to 0.015%
- Volts, ohms, amps and frequency measurements
- Dedicated dc leakage current measurement
- CAT I 1000 V, CAT II 600 V



Make accurate 4-wire resistance measurements with only two test leads!



With the unique dual display, you can measure two different parameters of the same signal from one test connection.

### ANOTHER PRODUCT FOR CONSIDERATION

If you need greater accuracy, the DMM4050 provides 6.5 digits of resolution and up to 0.0024% basic V dc accuracy.

### SHIPS WITH PRODUCT

- One Set TL710 Test Leads
- RS-232 to USB Adapter Cable
- Statement of Calibration Practices
- User Documentation
- Power Cord
- 3-year Warranty

### LEARN MORE

with the “Using the DMM Series to Make Simple and Accurate Resistance Measurements” Application Note.





## DMM4040/4050

Meet the multimeter to rule them all. Make a wide range of measurements—from volts, ohms and amps to frequency, temperature and capacitance—with one instrument. Monitor and record measurements over time, or environmental changes with built-in histogram, TrendPlot™ testing and statistics analysis modes. Get unparalleled ease of use with a dual display and USB connectivity. Hello, efficiency. Goodbye, complexity.

 DATA SHEET

 VIRTUAL TOUR

 360° VIEW

### PRODUCT HIGHLIGHTS

- 6.5 digit resolution
- Basic V DC accuracy of up to 0.0024%
- Volts, ohms, amps, frequency and period measurements
- Capacitance and temperature measurements (DMM4050)
- CAT I 1000 V, CAT II 600 V



Make accurate 4-wire resistance measurements with only two test leads!



See how your device is changing over time with built-in analysis modes – TrendPlot™, histograms and statistics.

MODELS	DISPLAY	RESOLUTION (DIGITS)	MEASUREMENTS	BASIC V DC ACCURACY (% READING + % RANGE)
DMM4040	Dual; Numeric & Graphical	6.5	V <sub>AC</sub> , V <sub>DC</sub> , I <sub>DC</sub> , I <sub>AC</sub> , Ω, Continuity, Diode, Freq, Period	0.0035 + 0.0005
DMM4050	Dual; Numeric & Graphical	6.5	V <sub>AC</sub> , V <sub>DC</sub> , I <sub>DC</sub> , I <sub>AC</sub> , Ω, Continuity, Diode, Freq, Period, Temp., Capacitance	0.0024 + 0.0005

### RECOMMENDED TEST LEADS

#### Temperature Probes

TP750 100 Ohm RTD Temperature Probe (DMM4050 only)

#### Test Leads

196-3520-xx Premium Test Leads (TL710 replacement/spare)

TL705 2x4 Wire Ohm 1000V Test Lead

TL725 2x4 Wire Ohm SMD Test Tweezers

### RECOMMENDED ACCESSORIES

#### Accessories

ACD4000 Soft Carrying Case

HCTEK-4321 Hard Carrying Case

RMU2U Rackmount Kit

013-0369-xx Calibration Fixture 4-terminal short

### RECOMMENDED SERVICE

SILV100 5-year Extended Warranty

### ANOTHER PRODUCT FOR CONSIDERATION

The PWS DC Power Supply Series is designed to stack with the DMM Series, saving you bench space.

### SHIPS WITH PRODUCT

- One Set TL710 Test Leads
- RS-232 to USB Adapter Cable
- Calibration Certificate
- User Documentation
- Power Cord
- 3-year Warranty

LEARN MORE with the “Measurement Statistics and Histograms with the Tektronix DMM4050 and DMM4040 Multimeters” Application Note.



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