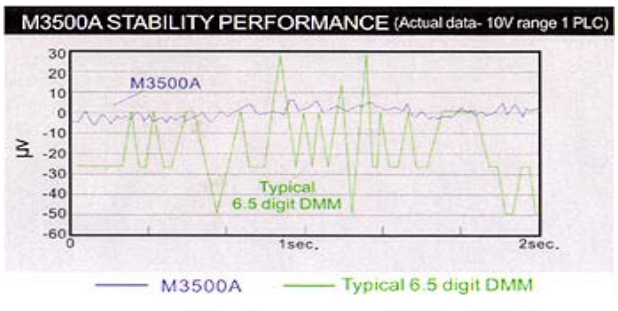
Product Information – Picotest M3500A 6.5 Digit DMM

The M3500A trumps the 34401A in almost every regard. This industry standard multimeter provides high quality performance for system and benchtop testing. The M3500A is much more than a 6.5 digit DMM. Utilizing a 10 Channel or 20 Channel Scanner Card (optional) it is a data acquisition unit that provides the highest stability readings. Like all Picotest products, it's backed by our 3 year warranty and 30 day refund policy.

KEY FEATURES:

- **Scanner Card - 10 or 20 Channel**
- **Supports RTD and Thermocouple**
- **Stand alone software**
- **Integration with EXCEL**
- **2000 reading/second**
- **MX+B and % Math Functions**
- **Digital Filter**
- **2000 reading internal memory**
- **Custom slope integrating A/D for improved measurement stability**
- **6 1/2:59 reading/sec 1PLC**
- **Accuracy 0.0035% for DC, 0.06%for AC (1-year)**
- **True RMS AC Volts and Current**
- **2- or 4-Wire Ω, Frequency/Period, Continuity, Diode Test**



Detailed Specifications – Picotest M3500A 6.5 Digit DMM

The M3500A USB Digital Multimeter/Data Acquisition Systems is a high accuracy (35ppm), 6½-digit resolution is ideal for critical measurements. It features 11 measurement functions and 8 math functions to easily accommodate the most commonly measured parameters. All accessories, such as USB cable, probes, and software, are included with the M3500A. With its unique combination of high precision and low total cost of ownership, the M3500A is an unbeatable value for R&D engineers, test engineers, scientists, and students making basic precision measurements on the bench and in system applications. Like all Picotest products, it's backed by our 3 year warranty and 30 day refund policy.

Key Features and Specifications

1. High precision 6.5-digit DMM for critical measurements at a 5.5-digit price
2. 11 measurement functions cover most commonly measured parameters
3. Data Acquisition Capabilities with an added 10 or 20 Channel Card (optional)
4. Fully specified accuracies on all functions for ISO-compliant results
5. TMC compliant USB 2.0 interface for use with SCPI test programs
6. Included PC software utilities for graphing and data sharing in both Microsoft® Word and Excel
7. Rugged construction for durability in bench/portable applications
8. Selectable front/rear inputs facilitate bench or rack use
9. Includes all accessories, such as startup software, USB cable, power cable, and safety test leads, for lowest total cost
10. UL listed; CE compliant

High Precision, Low Cost

The M3500A provides stability, accuracy, and speed at a very low cost. It has 0.0035% DC voltage accuracy on the 10V range and 0.01% resistance accuracy on the 10KΩ range. At 6.5 digits, the M3500A delivers 55 triggered readings/s via the USB remote interface, but only when the PCL is at 60Hz. At the fast 4.5 digit setting, it reads over 2000 readings/s into its 2000 reading internal buffer.

The M3500A provides a wide number of measurement ranges and functions:

1. DC voltage: 0.1V, 1V, 10V, 100V, and 1000V
2. AC voltage: 0.1V, 1V, 10V, 100V, and 750V
3. DC current: 10mA, 100mA, 1A, and 3A
4. AC current: 1A and 3A
5. Two- and four-wire resistance: 100Ω, 1kΩ, 10kΩ, 100kΩ, 1MΩ, 10MΩ, and 100MΩ.
6. Frequency: From 3Hz to 300 kHz
7. Period measurement
8. Diode measurement
9. Programmable A-D converter and filter settings for signal to noise optimization

Additionally, eight mathematical operations can be performed on measurement readings: RATIO, %, Min/Max, NULL, Limits, mX+b, dB, and dBm testing. Microsoft® Office, Word, and Excel add-in tools allow remote storage and recall of the measured values from these applications. A graphing utility enables charting of measurements versus time for trending and noise observations.

TMC compliant USB remote interface enables control from a PC for consistent test/calibration procedure execution and easy re-use of existing SCPI programs, including Agilent Model 34401A command emulation.

Simple to Use

The M3500A can be setup quickly and is very easy to use. It has a high contrast front panel and keypad that are intuitive and user-friendly. An easy to read 5×7 dot matrix, vacuum fluorescent display (VFD) offers three-color enunciators so users can easily distinguish each function symbol by its color.

Strength and Versatility

With its rugged construction and rubber bumpers, the M3500A has the durability to withstand bench, portable, or stacking applications. A sturdy carrying handle facilitates transportability.

Applications

The M3500A USB Digital Multimeter is ideal for applications in electronic device, circuit, module, and product testing; low cost production testing of electrical and electronic components, sub-assemblies, and end products; and student lab assignments. Typical applications include:

1. Test Engineers: Manual and semi-automatic electrical functional test
2. Development Engineers: Electrical/electronic circuit and product validation
3. Service/Calibration Technicians: Electronic product repair and calibration
4. Research Scientists: Electrical and physics experiments testing
5. Engineering Students: Electronic device and circuits experiment testing

Accessories

The M3500A USB Digital Multimeter is ideal for applications in electronic device, circuit, module, and product testing; low cost production testing of electrical and electronic components, sub-assemblies, and end products; and student lab assignments. Typical applications include:

1. M3500-opt01: Multi-point Scanner Card
2. M3500-opt02: Thermocouple Adapter
3. M3500-opt03: BNC to Banana Adapter

4. M3500-opt04: GPIB Card
5. M3500-opt05: RTD Probe Adapter
6. M3500-opt06: RS232 card
7. M3500-opt07: Kelvin Probe
8. M3500-opt08: 4-Wire Test Leads
9. M3500-opt09: 20 Channel Scanner Card
10. M3500-opt10: Shorting Plug
11. M3500-opt11: K Type Thermocouple Probe

Startup Software, PC utilities Included

PT-Tool application provides charting and graphing capabilities without programming to simplify setup, checkout, and basic measurement applications requiring graphical data representation. Scale, offset, and level can be adjusted to fine tune images for visual evaluation of signal and noise elements over time. Also includes tabular data and SCPI command prompt windows for maximum flexibility. Data sets can also be saved to disk files.

Microsoft Excel Add-In utility is also included and provides quick data import into standard Microsoft Excel spreadsheet, including selectable graphing, instrument settings, and number of data points collected. Data can then be analyzed through standard or options Microsoft Excel functions, including graphical, statistical, and trend charting. A version supporting Microsoft Word is also included for direct data import into reports.

Specification List

DC Characteristics Accuracy ± (% of reading + % of range)[1]				
Function	**Range[2]**	**Resolution**	**Input Resistance**	**1 Year (23°C ± 5°C)**
DCV[3] (DC Voltage)	100.0000 mV	0.1 uV	> 10GΩ	0.0050 + 0.0035
	1.000000 V	1.0 uV	> 10GΩ	0.0040 + 0.0007
	10.00000 V	10 uV	> 10GΩ	0.0035 + 0.0005
	100.0000 V	100 uV	10MΩ	0.0045 + 0.0006
	1000.000 V	1 mV	10MΩ	0.0045 + 0.0010

Function	**Range**	**Resolution**	**Shunt Resistance**	**1 Year (23°C ± 5°C)**
DCI (DC Current)	10.000000mA	10 nA	5.1Ω	0.050 + 0.020
	100.00000mA	100 nA	5.1Ω	0.050 + 0.005
	1.000000A	1 uA	0.1Ω	0.100 + 0.010
	3.00000A	10 uA	0.1Ω	0.120 + 0.020

Function	**Range**	**Resolution**	**Test Current**	**1 Year (23°C ± 5°C)**
Resistance[4]	100.0000 Ω	100 uΩ	1 mA	0.010 + 0.004
	1.000000 KΩ	1 mΩ	1 mA	0.010 + 0.001
	10.00000 KΩ	10 mΩ	100 uA	0.010 + 0.001
	100.0000 KΩ	100 mΩ	10 uA	0.010 + 0.001
	1.000000 MΩ	1 Ω	5 uA	0.010 + 0.001
	10.00000 MΩ	10 Ω	500 nA	0.040 + 0.001
	100.0000 MΩ	100 Ω	500 nA// 10MΩ	0.800 + 0.010
Diode Test	1.0000V	10 uV	1mA	0.010 + 0.020
Continuity	1000.00KΩ	10 mΩ	1mA	0.010 + 0.030

[1] Specifications are for 6 ½ digits and two hours warm up.

[2] 20% over range on all ranges except 1000Vdc and 3 A range.

[3] a. Using continuous integrating A/D converter.
b. Input bias current: less than 30 pA at 25° C.
c. Input protection: 1000V, all range.

[4] a. Specifications are for 4-wire ohms. For 2-wire ohms, use Math Null function.
b. Max. Lead Resistance: 10% of range per lead for 100Ω and 1KΩ ranges; 1kΩ per lead for all other ranges.
c. Input protection: 1000 V, all ranges.

Frequency and Period Characteristics

Accuracy ± (% of reading)[5]

Function	Range[6]	Frequency (Hz)	1 Year 23° C±5° C
Frequency & Period	**100mV to 750V**	3-5	0.10
		5-10	0.05
		10-40	0.03
		40-300K	0.01

AC Characteristics

Accuracy ± (% of reading + % of range)[7]

Function	Range[6]	Resolution	Frequency (Hz)	1 Year 23° C±5° C
ACV[8] (AC True RMS Voltage)	100.0000mV	0.1 uV	3-5	1.00 + 0.04
			5-10	0.35 + 0.04
			10-20K	0.06 + 0.04
			20-50K	0.12 + 0.05
			50K – 100K	0.60 + 0.08
			100K – 300K	4.00 + 0.50
	1.000000V to 750.000V	1.0 uV to 1mV	3-5	1.00 + 0.03
			5-10	0.35 + 0.03
			10-20K	0.06 + 0.03
			20-50K	0.12 + 0.05
			50K – 100K[9]	0.60 + 0.08
			100K – 300K	4.00 + 0.50
ACI[8] (AC True RMS Current)	1.000000A	1 uV	3-5	1.00 + 0.04
			5-10	0.30 + 0.04
			10-5K	0.10 + 0.04
	3.000000A	10 uV	3-5	1.10 + 0.06
			5-10	0.35 + 0.06
			10-5K	0.15 + 0.06

[5] Specifications are for 6 ½ digits and two hours warm up.

[6] 20% over range on all ranges except 750 Vac range.

[7] Specifications are for 6 ½ digits and two hours warm up, slow AC filter (3 Hz Bandwidth), sine wave input.

[8] Specifications are for sine wave input>5% of range. When the inputs are from 1% to 5% of range and <50 KHz, add the additional error for 0.1% of range. For 50 KHz to 100 KHz, add 0.13% of range.

[9] 750Vac range is limited to 100 KHz.

General Specifications

item	Limitation & description
Power Supply	100V/120V/220V/240V ± 10%
Power Line Frequency	50/60 Hz ± 10%
Power Consumption	25 VA peak (16 W average)
Operating Temperature	0°C to 50°C
Operating Humidity	Maximum relative humidity 80% for temperature up to 31°C
Storage Temperature	- 40°C to 70°C
Operating Altitude	Up to 2000m
Bench Dimensions (WxHxD)	224mm x 113mm x 373mm
Weight	4.36 kg
Safety[10]	IEC61010-1:2001/EN61010-1:2001 (2nd Edition) UL61010-1:2004 Measurement CAT II 600V, CAT I 1000V Pollution Degree 2
EMC	EN61326:1997+A1:1998+A2:2001+A3:2003 **EMI:** CISPR 11:1997+A1:1999+A2:2002 Class B IEC61000-3-2:2000 IEC61000-3-3:1994+A1:2001 **EMS:** IEC61000-4-2:1995+A1:1998+A2:2000 IEC61000-4-3:2002 IEC61000-4-4:2004 IEC61000-4-5:1995+A1:2000 IEC61000-4-6:1996+A1:2000 IEC61000-4-8:1993+A1:2000 IEC61000-4-11:1994+A1:2000

Specifications are subject to change without notice.

[10] The LO jack is marked with 500Vpk against ground and SENSE HI to LO is only marked with 200Vpk, in opposition to the label of 600V CAT II and/or 1000V CAT I against ground and IEC 61010-1.