

Review: Metertech MT 301 Digital Capacitance Meter

By Andy Emmerson G8PTH

The most important items of test gear on the bench at G8PTH are the scope and the multimeters, both analogue and digital. After these come the logic probe (two of these as well!) and the capacitance meter. Sure, I managed without a capacitance meter for a long time but two years ago I built a rudimentary one from a kit, and at last I had a means of checking doubtful tantalums (or is it tantala?) and finding the value of unmarked trimmers and subminiature ceramics. This opened up a new world of convenience, even though the device was bulky, had a restricted range and suffered from the effect of stray capacitance.

Now a number of newer, sophisticated hand-held devices have appeared on the market. Specifications and prices vary and I looked through several catalogues before deciding that the Metertech Digital Capacitance Meter (DCM) offered the best combination. A bonus is that its style matches the digital multimeter sold under several names including Metertech and Ross Electronics. I like matching pairs! So I actually bought one (no freebie samples unfortunately!) and I thought my findings might be of interest to others hovering on the brink of choosing a DCM.

Like many hand held digital multimeters the Metertech DCM comes in a grey plastic case with $\frac{1}{2}$ " $3\frac{1}{2}$ digit liquid crystal display. (In case you wonder what $3\frac{1}{2}$ digits look like, the half digit can only appear as a 1 or a blank, the other three digits look normal.) A stand will prop up the DCM for use on the bench. The capacitor under test is held by two crocodile clips on short flexible leads, and to avoid stray capacitance problems it is unwise to

replace these leads with longer ones. The meter is powered by a PP3 9 volt battery (Supplied) and the controls cover on/off, a knob for zeroing the display and range selection. Testing range is wide, from 0.1pF to 2000 μ F, with a claimed accuracy of 0.5%. The meter is protected against damage from charged capacitors up to at least 50 volts, though in your own interest you should discharge a capacitor before making tests. A sensible and fairly well translated handbook is supplied, with useful tables of capacitor characteristics at the end.

In use the DCM does all that is claimed of it. Sampling time is stated as 0.5 second, though on the lowest ranges the meter does take a while to settle. Any stray capacitance is nulled out by the zero control before the capacitor is

tested and causes no real problem. So far I have no cause for dissatisfaction and I would certainly recommend this device. The distributor claims to have sold quite a number to major industrial concerns and I think the only thing which may put off the average hobbyist is the price, which is £69 + VAT (a case is £6 extra). There are of course some cheaper devices on the market, also add-ons for digital frequency meters, but these involve some degree of compromise and in the end you must decide how highly you value this device. Certainly having once had a DCM I would not like to give it up!

(NOTE: Since I bought my meter I have noted a similar looking device in some shops bearing the ALTAI name. The price is similar as well.)

GENERAL SPECIFICATIONS

Display:	13mm(0.5")LCD (liquid Crystal Display) Max. indication 1999	Operating temperature: 0°C to 40°C(32°F to 104°F)
Range:	8 Ranges with full scale values from 200pF to 2000 μ F	Operating humidity: less than 80% RH
Overload indication:	Indication of "1"	Power supply:
Calibration adjustments:	One internal adjustment for accuracy. One front-panel adjustment for zero.	006P DC 9V battery
Zero adjust:	External adjustment for zero value of the display. This is limited to ± 20 pF.	Battery life:
Out of Range indication:	Indication of "1"	Approximately 200 hours on alkaline or 100 hours on carbon zinc battery with normal usage. (Typical current consumption 3-4mA on 200pF-200 μ F range)
Sampling times:	0.5 second	Dimension:
Time base:	Crystal OSC	180x82 x 39mm (7.1" x 3.3" x 1.5")
		Weight:
		280g (0.62lb)(including battery)
		Standard accessories:
		Test alligator clips (red and black)
		Spare fuse (0.2A)
		Instruction manual

ELECTRICAL SPECIFICATION

Normal Range	Max. In-range Display	Resolution	
200 pF	199.9 pF	0.1 pF	
2 nF	1.999 nF	1 pF	pF = picofarad (10^{-12})
20 nF	19.99 nF	10 pF	nF = nanofarad (10^{-9})
200 nF	199.9 nF	100 pF	μ F = microfarad (10^{-6})
2 μ F	1.999 μ F	1000 pF	
20 μ F	19.99 μ F	0.01 μ F	
200 μ F	199.9 μ F	0.1 μ F	
2000 μ F	1999 μ F	1 μ F	
Accuracy (25°C \pm 5°C)	0.5% of full scale \pm 1 LSD (least significant digit) on 200pF to 200 μ F ranges. 1% of full scale \pm 1 LSD on 2000 μ F range		
Excitation voltage	2.8 volts peak, maximum. High input terminal is always more positive than -ve terminal.		
Zero adjustment	± 20 pF		
Protection	The meter is protected against damage from charged capacitors (more than DC 50 volt) by the fuse (0.2A).		

PRICE £69 + VAT Case £6 + VAT
DISTRIBUTOR Centemp, 62 Curtis Road, Whitton, Hounslow, Middx, TW 4 5PT.
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