

## 8081 DMM Remote Commands

All Commands are subject to change to accommodate improved functionality.

All commands followed by Carriage Return or Line Feed (ASCII 13 or 10) or both.

Replies:

Commands (excluding Reading commands) will give a response code.

Successful commands are followed by \*0<cr><lf>.

Unrecognised commands are followed by \*9<cr><lf>.

Commands with incorrect range are followed by \*7<cr><lf>.

Unauthorised commands are followed by \*6<cr><lf>.

Correct commands with incorrect parameters are followed by \*3<cr><lf>.

Correct commands with an incorrect input signal are followed by \*2<cr><lf>.

## SCPI Compatible

Command words are separated by a colon. A space is required between the command words and the parameters. Command words are not case sensitive.

Command	Format	Parameters
Transmit Reading	READ?	
Transmit Frequency	FREQ?	
	*TRG	
Select AC Voltage Range	RANGE:AC:VOLTAGE<space> <value>,<accuracy> RANGE:AC:VOLT<space> <value>	value = 0.01 to 1000 Volts accuracy = 4-8 digits displayed
Select DC Voltage Range	RANGE:DC:VOLTAGE<space> <value> RANGE:DC:VOLT <space><value>	value = 0.1 to 1000
Select AC Current Range	RANGE:AC:CURRENT <space><value> RANGE:AC:CURR<space> <value>	value = 10 <sup>-4</sup> to 30
Select DC Current Range	RANGE:DC:CURRENT <space><value> RANGE:DC:CURR<space> <value>	value = 10 <sup>-8</sup> to 30
Select 4-Wire Resistance (previously selected measurement current)	RANGE:FRES<space> <value> RANGE:FRESISTANCE<space> <value>	value=1 to 10 <sup>7</sup>
Select 4-Wire Resistance Low measurement current	RANGE:FRES:LOWI<space> <value> RANGE:FRESISTANCE:LOWI<space> <value>	value=100 to 10,000
Select 4-Wire Resistance High measurement current	RANGE:FRES: HIGHI <space> <value> RANGE:FRESISTANCE: HIGHI <space> <value>	value=100 to 10,000
Select 2-Wire Resistance (previously selected measurement current)	RANGE:RES <space><value> RANGE:RESISTANCE <space><value>	value=1 to 10 <sup>12</sup>
Select 2-Wire Resistance Low measurement current	RANGE:RES:LOWI<space> <value> RANGE:RESISTANCE:LOWI<space> <value>	value=100 to 10,000
Select 2-Wire Resistance High measurement current	RANGE:RES:HIGHI<space> <value> RANGE:RESISTANCE:HIGHI<space> <value>	value=100 to 10,000
		(value may be modified by SI Prefixes: n, u, m, k, M, G, T) Exponent notation should be used for numbers less than 10 <sup>-7</sup> (1.0E-7)
Displayed Digits – use accuracy parameter of RANGE command	e.g. RANGE:DC:VOLT 1k,0.01 1kV@10mV resolution equivalent to 5 Digits e.g. RANGE:DC:VOLT 10,10u	

	10V@10uV resolution equivalent to 7 Digits	
Displayed Digits	DISPLAY:DIGITS <value>	value=4 to 8
Select Frequency Range (Voltage Input)	RANGE:FREQ <value> RANGE:FREQ:VOLTAGE <value>	value = 0.1 – 1000 to set voltage range value = “auto” or blank to autorange
Select Frequency Range (Current Input)	RANGE:FREQ:CURRENT <value>	value = 0.0001 – 30 to set current range value = “auto” or blank to autorange
Shunt Measurement	RANGE:SHUNT	
Power Measurement	RANGE:POWER	
Pressure Measurement	RANGE:PRESSURE <transducer>,<unit>	transducer=1-8 1=TMP010 2=TMP011 etc. unit=1-9 1=Bar, 2=PSI, 3=Pa, 4=mmHg, 5=cmH <sub>2</sub> O, 6=Atm., 7=kg/cm <sup>2</sup> , 8=oz/in <sup>2</sup> , 9=inHg
AC DC Coupling	INPUT:ACDC {ON,OFF}	Must be in AC range
Guard Floating	INPUT:GUARD FLOAT	
Guard to Low	INPUT:GUARD LOW	
Ohms Compensation	INPUT:OHMSCOMP {ON,OFF}	
Select Input Terminals	ROUTE:TERMINALS <value>	value = {FRONT,REAR}
Input Scan	ROUTE:SCAN {ON,OFF}	
Ratio Set Reference Value	ROUTE:RATIO <value>	value = reference standard in range units
Ratio Measurement	ROUTE:RATIO {ON,OFF}	
Maths Set Null	CALC:NULL	Null value stored in non-volatile memory
Maths Clear Null	CALC:NULL CLEAR	
Maths Set Offset	CALC:SCALE <value>	value = multiplication factor
Maths Set Scale	CALC:OFFSET <value>	value = offset in range units
Maths Clear Formula	CALC:CLEAR	
display dB	CALC:DB	
display dB	CALC:DBM	
dB Set Reference Resistance	CALC:DB:REF <value>	value=10-10000 Ohms
dB Set Zero	CALC:DB:ZERO	
Pressure Transducer Coefficient Setup	CALIBRATE:PRESSURE <transducer>,<value>	transducer=1-8 value=1.0
PRT Coefficient Setup (IEC)	CALIBRATE:PRT:IEC <terminal>, <coefficient>,<value>	terminal = F,R coefficient = R0,A,B,C
PRT Coefficient Setup (ITS)	CALIBRATE:PRT:ITS <terminal>,<coefficient>,<value>	terminal = F,R coefficient = R0,A1,B1,A2,B2,C
Identification String	*IDN?	

## General

Command	Format	Parameters
Transmit Next Reading	T	
Transmit Currently Displayed Reading	t	

Use Rear Terminals	r	
Use Front Terminals	f	
Set Range	R<Range Number>	Range Number = 1 to 70
Select Auto Ranging	RA1	
Select Manual Ranging	RA0	
Set Filter Range	FILTER:DIGITAL<space><Filter Range> or F<Filter Range>	Filter Range = 0 to 9 for filter times: 125ms,250ms,500ms,1s,2s,4s,8s,16s,32s,64s
Dynamic Filter	FD<n>	ON: n=1 OFF: n=0
Set Digits	D<Digits>	Digits = 4 to 8
Show Status	s	
Set Null	n	
Clear Null	N	
Display Date	a	
Version Information	v	
Internal Temperature	TEMP?	
Specification Accuracy	SPEC?	Dynamic Instrument Specification
Combined Uncertainty	UNCERT?	Specification & Imported & Experimental & resolution
Standard Deviation	STDDEV?	Experimental Uncertainty of most recent reading. >1S Sample time required
Thermocouple	RANGE:THERMOCOUPLE:<TC_TYPE> <space><cold_junction> where TC_TYPE = {B,E,J,K,N,R,S,T}	<cold_junction> = {-273 to 1800}°C or {AUTO,A,a}
PRT (ITS 90 Linearization)	RANGE:PRT:ITS<space> <probe>	probe = { {f,front}, {r,rear}, {d,dual} }
PRT (IEC751 Linearization)	RANGE:PRT:IEC<space> <probe> RANGE:PRT<space> <probe>	probe = { {f,front}, {r,rear}, {d,dual} }
Electrometer Voltage	ELECTROMETER:VOLTAGE <space><voltage>	voltage = {50,100,150,200,250,300}
Pressure Module Coefficients		
Analogue Filter	FILTER:ANALOGUE<space><state> FILTER:ANALOG<space><state>	state = ON,OFF,1,0
Reset to startup state	SYSTEM:RESET	Equivalent to front panel Reset button
Reboot meter	SYSTEM:REBOOT	Equivalent to power-up

## Setup

Command	Format	Parameters
Enter Password	k<Password>	Password = 1 to 10 digits User-changeable Calibration Password Fixed Setup Password Fixed Cal Password
Set Password	K<Password>	Password = 1 to 10 digits
Leave Password-protected mode	k0	
Set GPIB Address	COMMUNICATE:GPIB:ADDRESS<space><address>	address = {1-30}
Set Date	A<Date>	Date = DDMMYY

(Requires System Password or Unlocked Instrument)		

## Calibration

Commands that change the calibration memory require the correct calibration password to be sent.

Command	Format	Parameters
Clear Calibration Memory	CC	
Display All Calibration Factors	pa	
Display positive Cal Factor	pp	
Display negative Cal Factor	pn	
Display zero Cal Factor	pz	
Display Imported Uncertainties	pi	
Clear Imported Uncertainties	WI	
Display Specifications	ps	
Clear Specifications	WS	
Display PRT Table	pt	
Calibrate Current Range		
Set positive Cal Factor	CP	Input signal limits 70-130%
Set negative Cal Factor	CN	Input signal limits 70-130%
Set zero Cal Factor Set AC 20% Cal Factor	CZ	DC: Input signal limits -5 to 5%, value=0 AC: Input signal limits 5 to 30%, Value=20%
Calibrate to Value	CV <value>	value = value of input signal in current range units Positive value sets positive cal factor negative value sets negative cal factor Value Limits: 50-150% of range Input signal limits: 50-150% (Except AC 1kV 10-150%) (AC 30A 10-150% )
Calibrate Zero Factor to Value	CA <value>	value = value of input signal in current range units Value Limits: -5 to 50% of range Input signal limits: -5 to 50%
Clear Calibration Factors for current range	CX	
Set electrometer voltage output calibration factor (adjusts voltage output) Stored once. Best accuracy when calibrated at 300V	CALIBRATE:ELOUTPUT<space> <value>	value = measured electrometer voltage output limits: [Electrometer Voltage] ±25V
Set electrometer correction calibration factor (adjusts resistance calculation) Stored for each voltage setting	CALIBRATE:ELMEASURED<space> <value>	value = measured electrometer voltage output limits: [Electrometer Voltage] ±25V
Read back electrometer correction calibration factor	CALIBRATE:ELMEASURED<space> ?	
Show Calibration History	CALIBRATE:HISTORY	
Store Imported Uncertainty	Wi<range>,<type>,<value>	range = meter range for uncertainty DC Ranges: type = 0,1 for floor,ppm AC Ranges type = 0-11 (floor,ppm)

		for 6 frequency bands
Store Specification	Ws<range>,<type>,<value>	As Above
Store PRT Table Entry	Wt<key>,<value>	key = PRT Resistance value (1-350) value = Temperature value (Deg. C * 100,000)
Store Thermocouple Table Entry	Wc<type>,<EMF>,<temperature>	type = J,K etc. EMF = thermocouple voltage (mV) stored at 250mV Intervals Type B: 0 to 13500 Type E: 0 to 62000 Type J: -8000 to 70000 Type K: -6250 to 54000 Type N: -4250 to 48000 Type R: -250 to 21000 Type S: -250 to 19000 Type T: -6250 to 21000 temperature = (Deg. C * 10)

### Calibration Frequencies

{1,5,10,23,40,56,106,206,1k,2k,10k,20k,35k,50k,75k,100k,200k,400k,700k,1M} Hz

### Calibration Points

AC Ranges:

20% of Full Scale at 1kHz Reference Frequency

Full Scale at calibration Frequencies (or Calibrate to Value)

AC 30A Range

2A at 1kHz Reference Frequency

Full Scale (30A) at calibration Frequencies (or Calibrate to Value 10A-30A)

Resistance Ranges

Zero Calibration - Short

Full Scale (or Calibrate to Value  $\pm 20\%$  of FS)

DC Voltage Ranges

Zero Calibration – Short

Positive Full Scale, Negative Full Scale (or Calibrate to Value  $\pm$ )

DC Current Ranges

Zero Calibration – Open

Positive Full Scale, Negative Full Scale (or Calibrate to Value  $\pm$ )

(Calibrate to Value limits in calibration table)

### Ranges

Range	Description
0	No Function
1	100mV DC
2	1V
3	10V

4	100V
5	1kV
6	10nA DC (Electrometer)
7	100nA (Electrometer)
8	1uA (Electrometer)
9	10uA (Electrometer)
10	100uA
11	1mA
12	10mA
13	100mA
14	1A
15	10A
16	30A
17	10mV AC
18	100mV
19	1V
20	10V
21	100V
22	1kV
23	100uA AC
24	1mA
25	10mA
26	100mA
27	1A
28	10A
29	30A
30	-
31	-
32	-
33	1R 4 wire
34	10R
35	100R
36	1kR
37	10kR
38	100R Low I
39	1kR Low I
40	10kR Low I
41	100kR
42	1MR
43	10MR
44	1R 2 wire
45	10R
46	100R
47	1kR
48	10kR
49	100R Low I
50	1kR Low I
51	10kR Low I
52	100kR
53	1MR
54	10MR
56	10uA (Electrometer)

57	1uA (Electrometer)
58	100nA (Electrometer)
59	10nA (Electrometer)
60	PRT 100R
61	PRT 1kR
62	PRT 10kR
63	Pressure
64	Thermocouple