



## **XDM Series Digital Multimeter Programming Manual**

- **XDM3051**
- **XDM3041**

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## Table of Contents

Introduction to the SCPI Language.....	1
Syntax.....	1
Syntax Rules.....	1
Rule to format mnemonics.....	2
Usage of symbols.....	2
Parameter Type.....	3
Command Abbreviation.....	4
Contact Us.....	4
Third-party API.....	4
IEEE488.2 Common Commands.....	6
*CLS.....	6
*IDN.....	6
*OPC ?.....	7
*RST.....	7
SCPI Command List.....	7
SENSE command subsystem.....	7
[SENSe:]FUNCTion[1 2].....	8
[SENSe:]VOLTage:{AC DC}:RANGe.....	10
[SENSe:]VOLTage:{AC DC}:RANGe:AUTO.....	11
[SENSe:]VOLTage:{AC DC}:NULL.....	11
[SENSe:]VOLTage[:DC]:FILTer.....	12

## Content

---

[SENSe:]VOLTage[:DC]:IMPedance:AUTO .....	13
[SENSe:]CONt:THREshold .....	13
[SENSe:]CURRent:{AC DC}:RANGe .....	14
[SENSe:]CURRent:{AC DC}:RANGe:AUTO .....	15
[SENSe:]CURRent:{AC DC}:NULL .....	15
[SENSe:]CURRent[:DC]:FILTer .....	16
[SENSe:]{RESistance FRESistance}:RANGe .....	16
[SENSe:]{RESistance FRESistance}:RANGe:AUTO .....	17
[SENSe:]{RESistance FRESistance}:NULL .....	17
[SENSe:]{FREQuency PERiod}:VOLTage:RANGe .....	18
[SENSe:]{FREQuency PERiod}:VOLTage:NULL .....	19
[SENSe:]CAPacitance:RANGe .....	19
[SENSe:]CAPacitance:RANGe:AUTO .....	20
[SENSe:]CAPacitance:NULL .....	20
[SENSe:]TEMPerature:RTD:TYPE .....	21
[SENSe:]TEMPerature:RTD:NULL .....	22
[SENSe:]TEMPerature:RTD:UNIT .....	22
[SENSe:]TEMPerature:RTD:SHOW .....	23
CONFigure command sub system .....	23
CONFigure[:SCALar][:VOLTage]:{AC DC} .....	23
CONFigure[:SCALar]:CURRent:{AC DC} .....	24
CONFigure[:SCALar]:{RESistance FRESistance} .....	24
CONFigure[:SCALar]:{FREQuency PERiod} .....	25

## Content

---

CONFigure[:SCALar]:CAPacitance .....	26
CONFigure[:SCALar]:TEMPerature:RTD .....	26
CONFigure[:SCALar]:DIODE.....	27
CONFigure[:SCALar]:CONTInuity.....	27
CALCulate command Subsystem.....	27
CALCulate:AVERAge:ALL?.....	28
CALCulate:AVERAge:AVERAge? .....	28
CALCulate:AVERAge:COUNt?.....	29
CALCulate:AVERAge:MAXimum? .....	29
CALCulate:AVERAge:MINimum? .....	30
CALCulate:DB:REFerence .....	30
CALCulate:DBM:REFerence .....	31
CALCulate:FUNcTION.....	31
CALCulate:LIMit:FAIL? .....	31
CALCulate:LIMit:{LOWer UPPer}.....	32
CALCulate:LIMit:RESet.....	32
CALCulate:NULL:OFFSet .....	33
CALCulate:STATe .....	33
SYSTem command Subsystem .....	34
SYSTem:BEEPer:STATe .....	34
SYSTem:DATE? .....	34
SYSTem:TIME? .....	35
SYSTem:VERSion? .....	35

## Content

---

SYSTem:LOCal.....	36
SYSTem:REMOte.....	36
Other commands .....	37
AUTO .....	37
RANGE.....	37
RANGE1? .....	38
RANGE2? .....	39
RATE.....	40
MEAS? .....	40
MEAS1? .....	41
MEAS2? .....	41

## Introduction to the SCPI Language

### Syntax

SCPI commands present a hierarchical tree structure and contain multiple sub-systems, each of which is made up of a root keyword and one or more sub-keywords. The command string usually starts with ":", the keywords are separated by ":" and are followed by the parameter settings available, "?" is added at the end of the command string to indicate query and the command and parameter are separated by "space".

For example:

```
SENSe:VOLTage:DC:RANGe {<range>|MINimum|MAXimum}  
SENSe:VOLTage:DC:RANGe? [{MINimum|MAXimum}]
```

**SENSe** is the root keyword of the command. **VOLTage** and **DC** are the second-level and third-level keywords respectively. The command string starts with ":" which separates the multiple-level keywords. **<range>** represents parameters available for setting, "?" represents query and the command : **SENSe:VOLTage:DC:RANGe** and the parameter {<range>|MINimum|MAXimum} are separated by "space".

### Syntax Rules

SCPI language itself defines a group of sub-system keywords, and at the same time allows users to add or reduce keywords. Those keywords can be some meaningful English words and are easy to remember, which are called mnemonics. Mnemonic has long and short types. The short are the abbreviation of the long. Use specific character to separate keywords, data and sentences.

### **Rule to format mnemonics**

- 1) If the letter number of an English word is less than or equal to 4, then the word itself can be the mnemonic.(such as "Free" can be "FREE" );
- 2) If the letter number of an English word exceeds 4, then the first four letters will be the mnemonic.(such as "Frequency" can be "FREQ" );
- 3) If the fourth letter is vowel, then mnemonic uses the former three letters. Vowels consists of a, e, i, o, and u.(such as "Power" can be "POW" );
- 4) If it is not a word but a sentence, then use the first letters of the former words and the whole of the last word. (such as "Input Voltage " can be "IVOLTage" )

### **Usage of symbols**

- 1) Space

The space is used to separate command and parameter.

- 2) Colon:

If the colon is in front of the first character, it means the following is Root Command. When the colon is set between two keywords, then it means moving from the current level to the next level.

- 3) \*asterisk

The commands start with asterisk are named Common Command, which is used to execute IEEE488.2 common commands.

- 4) Braces{}

The parameters enclosed in the braces are optional and are usually separated by the vertical bar

"|". When using this command, one of the parameters must be selected.

5) Vertical Bar |

The vertical bar is used to separate multiple parameters and one of the parameters must be selected when using the command.

6) Triangle Brackets < >

The parameter enclosed in the triangle brackets must be replaced by an effective value.

### Parameter Type

1) **Value**

The command required to use value type parameter. It's compatible with all the common decimal display terms including optional symbol, decimal point, scientific notation and etc.

Specific value such as MIN, MAX and DEF are available.

*VOLTage:{AC|DC}:RANGe {<range>|MINimum|MAXimum}*

2) **Discrete**

The parameter should be one of the values listed. For example,

*TEMPerature:RTD:UNIT {C|F|K}*

3) **Integer**

Unless otherwise noted, the parameter can be any integer (NR1 format) within the effective value range. Note that, do not set the parameter to a decimal, otherwise errors will occur.

4) **Bool**



The parameter could be "OFF", "ON", for example,

*TEMPerature:RTD:NULL {OFF|ON}*

## Command Abbreviation

Each SCPI command can be written mixed with uppercase and lowercase according to the syntax rules, and the capital letter part is just the abbreviation of the command. If abbreviation is used, all the capital letters in the command must be written completely. For parameters with units, please refer to the detail parameter specifications in the sub-system.

*VOLTage:DC:RANGe*

*Abbreviation Below:*

*VOLT:DC:RANG*

## Contact Us

If you have any problem or requirement when using our products, please contact OWON.

Service & Support Hotline:**4006 909 365**

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Website : [www.owon.com.cn](http://www.owon.com.cn)

## Third-party API

The SCPI protocol of this product adopts USB port or LAN port to communication.

If you want to use the software of our company, after you open the software, click to enter

remote control, then click the SCPI command on the remoter control interface to enable SCPI protocol and communicate through SCPI protocol.

## IEEE488.2 Common Commands

### \*CLS

Clear all the event registers in the register set and clear the error queue.

### \*IDN

Return the ID character string of the instrument

#### Description

The query returns the ID character string of the instrument.

#### Return Format

OWON,<model>,<serial number>,X.XX.XX,{1|2}

<model> : the model number of the instrument

<serial number> : the serial number of the instrument

X.XX.XX : the software version of the instrument.

{1|2} : 1(3041) 2(3051)

#### Example

OWON,XDM3051,1546011,V2.0.2.0,2

OWON,XDM3051,1546011,V2.0.2.0,1

### **\*OPC ?**

Query whether the current operation is finished.

#### **Explanation**

Note the difference between the \*OPC? and \*OPC commands: the latter sets the "Operation Complete" bit (bit 0) in the standard event register to 1 after the current operation is finished.

#### **Return Format**

The query returns "1" if the current operation is finished, otherwise returns "0".

### **\*RST**

Restore the instrument to its default value.

## **SCPI Command List**

### **SENSe command subsystem**

SenSe subsystem configuration. The basic SenSe command is [SENSe:]FUNcTion[1|2], which can choose main display and sub display measurement function. FUNcTion[1|2] to switch mode.

Other SenSe command only change specific mode parameter, don't change mode, for example:

*VOLT:AC:RANGE:AUTO ON* command will start AC voltage mode and auto-measure, but don't switch to AC voltage mode.

**[SENSe:]FUNction[1|2]**

### Command format

**[SENSe:]FUNction[1|2] "<function>"**

**[SENSe:]FUNction[1|2]?**

### Function description

Select measure function, some functions can only be selected as main display.

### Parameter

**[1|2]**

1 for main display, 2 for sub display. If leave out this parameter, display defaults at 1 (main display).

**The parameter for [SENSe:]FUNction[1|2] "<function>", that is, can both been used as main or sub display:**

Name	Type	Parameter	Measure Function
<function>	discrete	VOLTage:AC	AC voltage measure
		VOLTage[:DC]	DC voltage measure
		CURRent:AC	AC current measure
		CURRent[:DC]	DC current measure
		FREQuency	Frequency measure
		PERiod	Period measure

The parameter for [SENSe:]FUNctIon[1] "<function>", that is, can only be used as main display :

Name	Type	Parameter	Measure Function
<function>	discrete	CAPacitance	Capacitor measure
		CONTInuity	Continuity test
		DIODe	Diode test
		FRESistance	Four-wire Resistance measure
		RESistance	Resistance measure
		TEMPerature:RTD	Temperature measure

The parameter for [SENSe:]FUNctIon[2] "<function>", that is, can only be used as sub display :

Name	Type	Parameter	Measure Function
<function>	discrete	NONE	close sub display

### Return format

Use quotation to keep abbreviated selected return function, no available keyword.

Return value	Measure function
VOLT AC	AC voltage measure
VOLT	DC voltage measure

CURR AC	AC current measure
CURR	DC current measure
FREQ	Frequency measure
PER	Period measure
CAP	Capacitance measure
CONT	Continuity test
DIOD	Diode test
FRES	Four-wire Resistance measure
RES	Resistance measure
TEMP	Temperature measure

For FUNCTION2? command, if not start dual display, then return NONE.

[SENSe:]VOLTage:{AC|DC}:RANGe

### Syntax

[SENSe:]VOLTage:{AC|DC}:RANGe {<range>|MINimum|MAXimum}  
[SENSe:]VOLTage:{AC|DC}:RANGe? [{MINimum|MAXimum}]

### Description

Select valid measuring range for AC or DC voltage measure

### Parameter

Name	Type	Range
------	------	-------

<range>	discrete	3051: AC: 200E-3(200mV), 2(2V), 20(20V), 200(200V), 750(750V) DC: 200E-3(200mV), 2(2V), 20(20V), 200(200V), 1000(1000V) 3041: AC: 600E-3(600mV), 6(6V), 60(60V), 600(600V), 750(750V) DC: 600E-3(600mV), 6(6V), 60(60V), 600(600V), 1000(1000V)
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**Return format**

Return query result by scientific notation.

**[SENSe:]VOLTage:{AC|DC}:RANGe:AUTO**

**Syntax**

*[SENSe:]VOLTage:{AC|DC}:RANGe:AUTO {OFF|ON}*

*[SENSe:]VOLTage:{AC|DC}:RANGe:AUTO?*

**Description**

Close or start auto-scale for AC or DC voltage measurement

**Parameter**

Name	Type	Range	Default
<bool>	Bool	{OFF ON}	ON

**Return format**

Return 0 (OFF) or 1 (ON) after query

**[SENSe:]VOLTage:{AC|DC}:NULL**

**Syntax**



**[SENSe:]VOLTage:{AC|DC}:NULL {OFF|ON}**

### Description

Close or start relative value for AC or DC measurement.

### Parameter

Name	Type	Range	Default
<bool>	Bool	{OFF ON}	OFF

### Return format

Return 0 (OFF) or 1 (ON) after query

**[SENSe:]VOLTage[:DC]:FILTer**

### Syntax

**[SENSe:]VOLTage[:DC]:FILTer[:STATe] {OFF|ON}**

**[SENSe:]VOLTage[:DC]:FILTer[:STATe]?**

### Description

Close or start simulated filter for DC measurement

### Parameter

Name	Type	Range	Default
<bool>	Bool	{OFF ON}	ON

### Return format

Return 0 (OFF) or 1 (ON) after query

**[SENSe:]VOLTage[:DC]:IMPedance:AUTO****Syntax**

*[SENSe:]VOLTage[:DC]:IMPedance:AUTO {OFF|ON}*

*[SENSe:]VOLTage[:DC]:IMPedance:AUTO?*

**Description**

Close or start auto input impedance mode for DC measurement

**Parameter**

Name	Type	Range	Default
<bool>	bool	{OFF ON}	OFF

**Note**

OFF: for all the measuring range, DC voltage input impedance is fixed at 10 M $\Omega$

ON: DC voltage measurement input impedance changes in accordance with measuring range.

Input impedance is 10 G $\Omega$  at 200mV and 2V measuring range, 10 M $\Omega$  at 20V, 200V and 1000V measuring range.

**Return format**

Return 0 (OFF) or 1 (ON) after query

**[SENSe:]CONT:THREshold****Syntax**

*[SENSe:]CONT:THREshold <values>*

**Description**

Sets the continuity threshold.

**[SENSe:]CURRent:{AC|DC}:RANGe**

**Syntax**

*[SENSe:]CURRent:{AC|DC}:RANGe {<range>|MINimum|MAXimum}*

*[SENSe:]CURRent:{AC|DC}:RANGe? [{MINimum|MAXimum}]*

**Description**

Select fixed measuring range for AC/DC current measurement

**Parameter**

Name	Type	Range
<range>	discrete	3051: AC: 20E-3(20mA), 200E-3(200mA), 2(2A), 10(10A) DC: 200E-6(200uA), 2E-3(2mA), 20E-3(20mA), 200E-3(200mA), 2(2A), 10(10A) 3041: AC: 60E-3(60mA), 600E-3(600mA), 6(6A), 10(10A) DC: 600E-6(600uA), 6E-3(6mA), 60E-3(60mA), 600E-3(600mA), 6(6A), 10(10A)

**Return format**

Return query result by scientific notation.

**[SENSe:]CURRent:{AC|DC}:RANGe:AUTO****Syntax***[SENSe:]CURRent:{AC|DC}:RANGe:AUTO {OFF|ON}**[SENSe:]CURRent:{AC|DC}:RANGe:AUTO?***Description**

Close or start auto-scale adjustment for AC/DC current measurement

**Parameter**

Name	Type	Range	Default
<bool>	Bool	{OFF ON}	ON

**Return format**

Return 0 (OFF) or 1 (ON) after query

**[SENSe:]CURRent:{AC|DC}:NULL****Syntax***[SENSe:]CURRent:{AC|DC}:NULL {OFF|ON}***Description**

Close or start relative value for AC/DC current measurement

**Parameter**

Name	Type	Range	Default
<bool>	Bool	{OFF ON}	OFF

**Return format**

Return 0 (OFF) or 1 (ON) after query

### **[SENSe:]CURRent[:DC]:FILTer**

#### **Syntax**

*[SENSe:]CURRent[:DC]:FILTer[:STATe] {OFF|ON}*

*[SENSe:]CURRent[:DC]:FILTer[:STATe]?*

#### **Description**

Close or start the simulated filter for DC current measurement.

#### **Parameter**

Name	Type	Range	Default
<bool>	Bool	{OFF ON}	ON

#### **Return format**

Return 0 (OFF) or 1 (ON) after query

### **[SENSe:]{RESistance|FRESistance}:RANGe**

#### **Syntax**

*[SENSe:]{RESistance|FRESistance}:RANGe {<range>|MINimum|MAXimum}*

*[SENSe:]{RESistance|FRESistance}:RANGe? [{MINimum|MAXimum}]*

#### **Description**

Select fixed measuring range for RESistance or FRESistance

#### **Parameter**

Name	Type	Range
------	------	-------

<range>	Bool	3051: 200(200Ω), 2E3(2KΩ), 20E3(20KΩ), 200E3(200KΩ), 2E6(2MΩ), 10E6(10MΩ), 100E6(100MΩ) 3041: 600(600Ω), 6E3(6KΩ), 60E3(60KΩ), 600E3(600KΩ), 6E6(6MΩ), 60E6(60MΩ), 100E6(100MΩ)
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**Return format**

Return query result by scientific notation.

**[SENSe:]{RESistance|FRESistance}:RANGe:AUTO**

**Syntax**

*[SENSe:]{RESistance|FRESistance}:RANGe:AUTO {OFF|ON}*

*[SENSe:]{RESistance|FRESistance}:RANGe:AUTO?*

**Description**

Close or start auto-scale adjustment for resistance measurement

**Parameter**

Name	Type	Range	Default
<bool>	Bool	{OFF ON}	ON

**Return format**

Return 0 (OFF) or 1 (ON) after query

**[SENSe:]{RESistance|FRESistance}:NULL**

**Syntax**

*[SENSe:]{RESistance|FRESistance}:NULL {OFF|ON}*

**Description**

Close or start relative value for resistance measurement.

**Parameter**

Name	Type	Range	Default
<bool>	Bool	{OFF ON}	OFF

**Return format**

Return 0 (OFF) or 1 (ON) after query

**[SENSe:]{FREQuency|PERiod}:VOLTage:RANGe**

**Syntax**

*[SENSe:]{FREQuency|PERiod}:VOLTage:RANGe {<range>|MINimum|MAXimum}*

*[SENSe:]{FREQuency|PERiod}:VOLTage:RANGe? [{MINimum|MAXimum}]*

**Description**

Select fixed voltage measuring range for FREQuency or PERiod.

**Parameter**

Name	Type	Range
<range>	Discrete	3051: 200E-3(200mV), 2(2V), 20(20V), 200(200V), 750(750V) 3041: 600E-3(600mV), 6(6V), 60(60V), 600(600V), 750(750V)

**Return format**

Return query result by scientific notation.

**[SENSe:]{FREQuency|PERiod}:VOLTage:NULL**

### Syntax

*[SENSe:]{FREQuency|PERiod}:VOLTage:NULL {OFF|ON}*

### Description

Close or start relative value for FREQuency or PERiod measurement.

### Parameter

Name	Type	Range	Default
<bool>	Bool	{OFF ON}	OFF

### Return format

Return 0 (OFF) or 1 (ON) after query

**[SENSe:]CAPacitance:RANGe**

### Syntax

*[SENSe:]CAPacitance:RANGe {<range>|MINimum|MAXimum}*

*[SENSe:]CAPacitance:RANGe? [{MINimum|MAXimum}]*

### Description

Select fixed measuring range for capacitance measurement.

### Parameter

Name	Type	Range
<range>	Discrete	2E-9(2nF), 20E-9(20nF), 200E-9(200nF), 2E-6(2uF), 20E-6(20uF),



		200E-6(200uF), 10E-3(10mF)
--	--	----------------------------

**Return format**

Return query result by scientific notation

**[SENSe:]CAPacitance:RANGe:AUTO****Syntax**

*[SENSe:]CAPacitance:RANGe:AUTO {OFF|ON}*

*[SENSe:]CAPacitance:RANGe:AUTO?*

**Description**

Close or start auto-scale adjustment for capacitance measurement.

**Parameter**

Name	Type	Range	Default
<bool>	Bool	{OFF ON}	ON

**Return format**

Return 0 (OFF) or 1 (ON) after query

**[SENSe:]CAPacitance:NULL****Syntax**

*[SENSe:]CAPacitance:NULL {OFF|ON}*

**Description**

Close or start relative value for capacitance measurement.

**Parameter**

Name	Type	Range	Default
<bool>	Bool	{OFF ON}	OFF

**Return format**

Return 0 (OFF) or 1 (ON) after query

**[SENSe:]TEMPerature:RTD:TYPe**

**Syntax**

**[SENSe:]TEMPerature:RTD:TYPe {<RTD Type>}**

**[SENSe:]TEMPerature:RTD:TYPe?**

**Description**

Select RTD type for temperature measurement.

**Parameter**

Name	Type	Range
<RTD Type >	Discrete	KITS90, NITS90, EITS90, JITS90, TITS90, SITS90, RITS90, BITS90, W5_26, W3_25, PT100, PT10, Cu100, Cu50

**Return format**

Return the query result by character.

**[SENSe:]TEMPerature:RTD:NULL****Syntax***[SENSe:]TEMPerature:RTD:NULL {OFF|ON}***Description**

Close or start relative value for temperature measurement.

**Parameter**

Name	Type	Range	Default
<bool>	Bool	{OFF ON}	OFF

**Return format**

Return 0 (OFF) or 1 (ON) after query

**[SENSe:]TEMPerature:RTD:UNIT****Syntax***[SENSe:]TEMPerature:RTD:UNIT {C|F|K}***Description**

Select temperature unit for temperature measurement, optional for C (Celsius), F(Fahrenheit), K(Kelvin).

**Return format**

Return the query result by character

**[SENSe:]TEMPerature:RTD:SHOW****Syntax***[SENSe:]TEMPerature:RTD:SHOW {TEMP|MEAS|ALL}***Description**

Select temperature measurement display mode, optional for TEMP (only display temperature), MEAS (only display measured value), ALL (display both temperature and measured value)

**Return format**

Return the query result by character

**CONFigure command sub system**

CONFigure sub system is used to switch measure mode

**CONFigure[:SCALar][:VOLTage]:{AC|DC}****Syntax***CONFigure[:SCALar][:VOLTage]:{AC|DC} [{<range>|MINimum|MAXimum|DEF|AUTO}]***Description**

Restore all the measurement and trigger parameters to default, process AC/DC voltage measurement. Then set the measuring range.

**Parameter**

Name	Type	Range
<range>	Discret	3051:

e	AC: 200E-3(200mV), 2(2V), 20(20V), 200(200V), 750(750V) DC: 200E-3(200mV), 2(2V), 20(20V), 200(200V), 1000(1000V) 3041: AC: 600E-3(600mV), 6(6V), 60(60V), 600(600V), 750(750V) DC: 600E-3(600mV), 6(6V), 60(60V), 600(600V), 1000(1000V)
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**CONFigure[:SCALar]:CURRent:{AC|DC}****Syntax**

**CONFigure[:SCALar]:CURRent:{AC|DC} [{<range>|MINimum|MAXimum|DEF|AUTO}]**

**Description**

Restore all the measurement and trigger parameters to default, process AC/DC current measurement. Then set the measuring range.

**Parameter**

Name	Type	Range
<range>	Discrete	3051: AC: 20E-3(20mA), 200E-3(200mA), 2(2A), 10(10A) DC: 200E-6(200uA), 2E-3(2mA), 20E-3(20mA), 200E-3(200mA), 2(2A), 10(10A) 3041: AC: 60E-3(60mA), 600E-3(600mA), 6(6A), 10(10A) DC: 600E-6(600uA), 6E-3(6mA), 60E-3(60mA), 600E-3(600mA), 6(6A), 10(10A)

**CONFigure[:SCALar]:{RESistance|FRESistance}****Syntax**

**CONFigure[:SCALar]:{RESistance|FRESistance} [{<range>|MINimum|MAXimum|DEF|AUTO}]**

**Description**

Restore all the measurement and trigger parameters to default, process RESistance and FRESistance measurement. Then set the measuring range.

#### Parameter

Name	Type	Range
<range>	Discrete	3051: 200(200Ω), 2E3(2KΩ), 20E3(20KΩ), 200E3(200KΩ), 2E6(2MΩ), 10E6(10MΩ), 100E6(100MΩ) 3041: 600(600Ω), 6E3(6KΩ), 60E3(60KΩ), 600E3(600KΩ), 6E6(6MΩ), 60E6(60MΩ), 100E6(100MΩ)

#### CONFigure[:SCALar]:{FREQuency|PERiod}

#### Syntax

*CONFigure[:SCALar]:{FREQuency|PERiod} [{<range>|MINimum|MAXimum|DEF|AUTO}]*

#### Description

Restore all the measurement and trigger parameters to default, process FREQuency/PERiod measurement. Then set the measuring range.

#### Parameter

Name	Type	Range
<range>	Discrete	3051: 200E-3(200mV), 2(2V), 20(20V), 200(200V), 750(750V) 3041: 600E-3(600mV), 6(6V), 60(60V), 600(600V), 750(750V)

**CONFigure[:SCALar]:CAPacitance****Syntax**

**CONFigure[:SCALar]:CAPacitance** [{<range>|MINimum|MAXimum|DEF|AUTO}]

**Description**

Restore all the measurement and trigger parameters to default, process capacitance measurement. Then set the scale.

**Parameter**

Name	Type	Range
<range>	Discrete	2E-9(2nF), 20E-9(20nF), 200E-9(200nF), 2E-6(2uF), 20E-6(20uF), 200E-6(200uF), 10E-3(10mF)

**CONFigure[:SCALar]:TEMPerature:RTD****Syntax**

**CONFigure[:SCALar]:TEMPerature:RTD** [{<RTD Type>}]

**Description**

Restore all the measurement and trigger parameters to default, process temperature measurement. Then set the RTD type.

**Parameter**

Name	Type	Range
<RTD Type >	Discrete	KITS90, NITS90, EITS90, JITS90, TITS90, SITS90, RITS90, BITS90, W5_26, W3_25, PT100, PT10, Cu100, Cu50

## **CONFigure[:SCALar]:DIODE**

### **Syntax**

*CONFigure[:SCALar]:DIODE*

### **Description**

Restore all the measurement and trigger parameters to default, process diode measurement.

### **Parameter**

## **CONFigure[:SCALar]:CONTInuity**

### **Syntax**

*CONFigure[:SCALar]:CONTInuity*

### **Description**

Restore all the measurement and trigger parameters to default, process continuity test.

### **Parameter**

## **CALCulate command Subsystem**

CALCulate command is used to manage math function (Sum up, limit, db/dbm, relative value),

Function command is used to switch math mode (from four modes). AVERage, DB,DBM, LIMit,



NULL command is used to set corresponding function parameter, won't change the current math function.

### **CALCulate:AVERage:ALL?**

#### **Syntax**

*CALCulate:AVERage:ALL?*

#### **Description**

Query returns the minimum value, maximum value , average value and count of all measurements taken since the statistics were last cleared.

#### **Parameter**

(none)

### **CALCulate:AVERage:AVERage?**

#### **Syntax**

*CALCulate:AVERage:AVERage?*

#### **Description**

Query returns the average value of all measurements taken since the statistics were last cleared.

#### **Parameter**

(none)

### **CALCulate:AVERage:COUNT?**

#### **Syntax**

*CALCulate:AVERage:COUNT?*

#### **Description**

Query returns the number of measurements taken since the statistics were last cleared.

#### **Parameter**

(none)

### **CALCulate:AVERage:MAXimum?**

#### **Syntax**

*CALCulate:AVERage:MAXimum?*

#### **Description**

Query returns the maximum value of all measurements taken since the statistics were last cleared.

#### **Parameter**

(none)

**CALCulate:AVERage:MINimum?****Syntax***CALCulate:AVERage:MINimum?***Description**

Query returns the minimum value of all measurements taken since the statistics were last cleared.

**Parameter**

(none)

**CALCulate:DB:REference****Syntax***CALCulate:DB:REference {<Ref R>|MINimum|MAXimum}**CALCulate:DB:REference?***Description**

Set DB relative resistance.

**Parameter**

Name	Type	Range
<Ref R>	Discrete	50, 75, 93, 110, 124, 125, 135, 150, 250, 300, 500, 600, 800, 900, 1000, 1200, 8000

**CALCulate:DBM:REFerence****Syntax***CALCulate:DBM:REFerence {<Ref R>|MINimum|MAXimum}**CALCulate:DBM:REFerence?***Description**

Set DBM relative resistance.

**Parameter**

Name	Type	Range
<Ref R>	Discrete	50, 75, 93, 110, 124, 125, 135, 150, 250, 300, 500, 600, 800, 900, 1000, 1200, 8000

**CALCulate:FUNction****Syntax***CALCulate:FUNction {NULL|DB|DBM|AVERage|LIMit}**CALCulate:FUNction?***Description**

Set mathematic calculation as NULL, DB, DBM, AVERage or LIMit.

**CALCulate:LIMit:FAIL?****Syntax***CALCulate:LIMit:FAIL?***Description**

Query returns the limit test results.

**Parameter**

(none)

**CALCulate:LIMit:{LOWer|UPPer}**

**Syntax**

*CALCulate:LIMit:{LOWer|UPPer} {<value>|MINimum|MAXimum}*

*CALCulate:LIMit:{LOWer|UPPer}?*

**Description**

Set lower or upper line for limit value

**Parameter**

Name	Type	Range
<value>		

**CALCulate:LIMit:RESet**

**Syntax**

*CALCulate:LIMit:RESet*

**Description**

Clears the flag bit and count of limit test.

**Parameter**

(none)

**CALCulate:NULL:OFFSet****Syntax***CALCulate:NULL:OFFSet {<value>|MINimum|MAXimum}**CALCulate:NULL:OFFSet? [MINimum|MAXimum]***Description**

Set relative value.

**Parameter**

Name	Type	Range
<value>		

**CALCulate:STATe****Syntax***CALCulate:STATe {OFF}***Description**

Close MATH function

**Parameter**

Name	Type	Range
<bool>	Bool	{OFF}

## SYSTEM command Subsystem

### SYSTEM:BEEPer:STATe

#### Syntax

*SYSTEM:BEEPer:STATe {ON|OFF}*

*SYSTEM:BEEPer:STATe?*

#### Description

Start or close the buzzer

#### Parameter

Name	Type	Range	默认值
<bool>	Bool	{ON OFF}	ON

#### Return format

Return 0 (OFF) or 1 (ON) after query.

### SYSTEM:DATE?

#### Syntax

*SYSTEM:DATE?*

#### Description

Query date (includes year, month and day) inside device real-time clock

#### Parameter

**Return format**

Return query result

**SYSTem:TIME?**

**Syntax**

*SYSTem:TIME?*

**Description**

Query time (includes hour, minute and second) inside device real-time clock

**Parameter**

**Return format**

Return query result

**SYSTem:VERSion?**

**Syntax**

*SYSTem:VERSion?*

**Description**

Query SCPI version

**Parameter**



**Return format**

Return query result

**SYSTem:LOCal**

**Syntax**

*SYSTem:LOCal*

**Description**

Exit SCPI mode

**Parameter**

**SYSTem:REMOte**

**Syntax**

*SYSTem:REMOte*

**Description**

Enter SCPI mode

**Parameter**

## Other commands

### AUTO

#### Syntax

*AUTO*

*AUTO?*

#### Description

Enable autoscale

#### Parameter

#### Return format

Return autoscale setting, 1 for auto, 0 for manual

### RANGE

#### Syntax

*RANGE {<range1>|DEF}*

#### Description

Set measuring range

#### Parameter

Name	Type	Range	
<range1>	Discre	DCV	3051 : 1(200mV), 2(2V), 3(20V), 4(200V), 5(1000V) 3041 : 1(600mV), 2(6V), 3(60V), 4(600V), 5(1000V)

	te	ACV	3051 : 1(200mV), 2(2V), 3(20V), 4(200V), 5(750V) 3041 : 1(600mV), 2(6V), 3(60V), 4(600V), 5(750V)
		DCI	3051 : 1(200uA), 2(2mA), 3(20mA), 4(200mA), 5(2A), 6(10A) 3041 : 1(600uA), 2(6mA), 3(60mA), 4(600mA), 5(6A), 6(10A)
		ACI	3051 : 1(20mA), 2(200mA), 3(2A), 4(10A) 3041 : 1(60mA), 2(600mA), 3(6A), 4(10A)
		RES/FRES	3051 : 1(200Ω), 2(2KΩ), 3(20KΩ), 4(200KΩ), 5(2MΩ), 6(10MΩ), 7(100MΩ) 3041 : 1(600Ω), 2(6KΩ), 3(60KΩ), 4(600KΩ), 5(6MΩ), 6(60MΩ), 7(100MΩ)
		CAP	1(2nF), 2(20nF), 3(200nF), 4(2uF), 5(20uF), 6(200uF), 7(10mF)
		FREQ/PER	3051 : 1(200mV), 2(2V), 3(20V), 4(200V), 5(750V) 3041 : 1(600mV), 2(6V), 3(60V), 4(600V), 5(750V)
		TEMP	1(KITS90),2(NITS90),3(EITS90),4(JITS90),5(TITS90),6(SITS90),7(RI TS90),8(BITS90),9(W5_26),10(W3_25),11(P T100),12(PT10),13(Cu100),14(Cu50)

**RANGE1?****Syntax****RANGE1?****Description**

Query main display measuring range

**Parameter****Return format**

DCV	3051 : 1(200mV), 2(2V), 3(20V), 4(200V), 5(1000V) 3041 : 1(600mV), 2(6V), 3(60V), 4(600V), 5(1000V)
ACV	3051 : 1(200mV), 2(2V), 3(20V), 4(200V), 5(750V) 3041 : 1(600mV), 2(6V), 3(60V), 4(600V), 5(750V)
DCI	3051 : 1(200uA), 2(2mA), 3(20mA), 4(200mA), 5(2A), 6(10A) 3041 : 1(600uA), 2(6mA), 3(60mA), 4(600mA), 5(6A), 6(10A)
ACI	3051 : 1(20mA), 2(200mA), 3(2A), 4(10A) 3041 : 1(60mA), 2(600mA), 3(6A), 4(10A)
RES/FRES	3051 : 1(200Ω), 2(2KΩ), 3(20KΩ), 4(200KΩ), 5(2MΩ), 6(10MΩ), 7(100MΩ) 3041 : 1(600Ω), 2(6KΩ), 3(60KΩ), 4(600KΩ), 5(6MΩ), 6(60MΩ), 7(100MΩ)

## IEEE488.2 Common Commands

CAP	1(2nF), 2(20nF), 3(200nF), 4(2uF), 5(20uF), 6(200uF), 7(10mF)
FREQ/PER	3051 : 1(200mV), 2(2V), 3(20V), 4(200V), 5(750V) 3041 : 1(600mV), 2(6V), 3(60V), 4(600V), 5(750V)
TEMP	1(KITS90),2(NITS90),3(EITS90),4(JITS90),5(TITS90),6(SITS90),7(RITS90),8(BITS90),9(W5_26),10(

If measure function is diode or continuity test, then return None.

### RANGE2?

#### Syntax

#### *RANGE2?*

#### Description

Query sub display measuring range.

#### Parameter

#### Return format

DCV	3051 : 1(200mV), 2(2V), 3(20V), 4(200V), 5(1000V) 3041 : 1(600mV), 2(6V), 3(60V), 4(600V), 5(1000V)
ACV	3051 : 1(200mV), 2(2V), 3(20V), 4(200V), 5(750V) 3041 : 1(600mV), 2(6V), 3(60V), 4(600V), 5(750V)
DCI	3051 : 1(200uA), 2(2mA), 3(20mA), 4(200mA), 5(2A), 6(10A) 3041 : 1(600uA), 2(6mA), 3(60mA), 4(600mA), 5(6A), 6(10A)
ACI	3051 : 1(20mA), 2(200mA), 3(2A), 4(10A) 3041 : 1(60mA), 2(600mA), 3(6A), 4(10A)
FREQ/PER	3051 : 1(200mV), 2(2V), 3(20V), 4(200V), 5(750V) 3041 : 1(600mV), 2(6V), 3(60V), 4(600V), 5(750V)

If measure function is diode or continuity test, then return None.

**RATE****Syntax***RATE <speed>**RATE?***Description**

Set speed.

**Parameter**

Name	Type	Range
<speed>	Discrete	F:high speed; M:middle speed; L:low speed

**Return format**

Return current speed, F for high speed, M for middle speed, L for low speed.

**MEAS?****Syntax***MEAS?***Description**

If start dual display, return main and sub display measured value; or return main display measure value.

**Parameter****Return format**

Return measured result by scientific notation. If start dual display, the return format is: main display measured value, sub display measured value.

## **MEAS1?**

### **Syntax**

*MEAS1?*

### **Description**

Return main display measured value

### **Parameter**

### **Return format**

Return measured result by scientific notation.

## **MEAS2?**

### **Syntax**

*MEAS2?*

### **Description**

Return sub display measured value

### **Parameter**

**Return format**

Return measured result by scientific notation.