owon HDS2062M-N Multimeter SCPI Protocol Instructions

Contents

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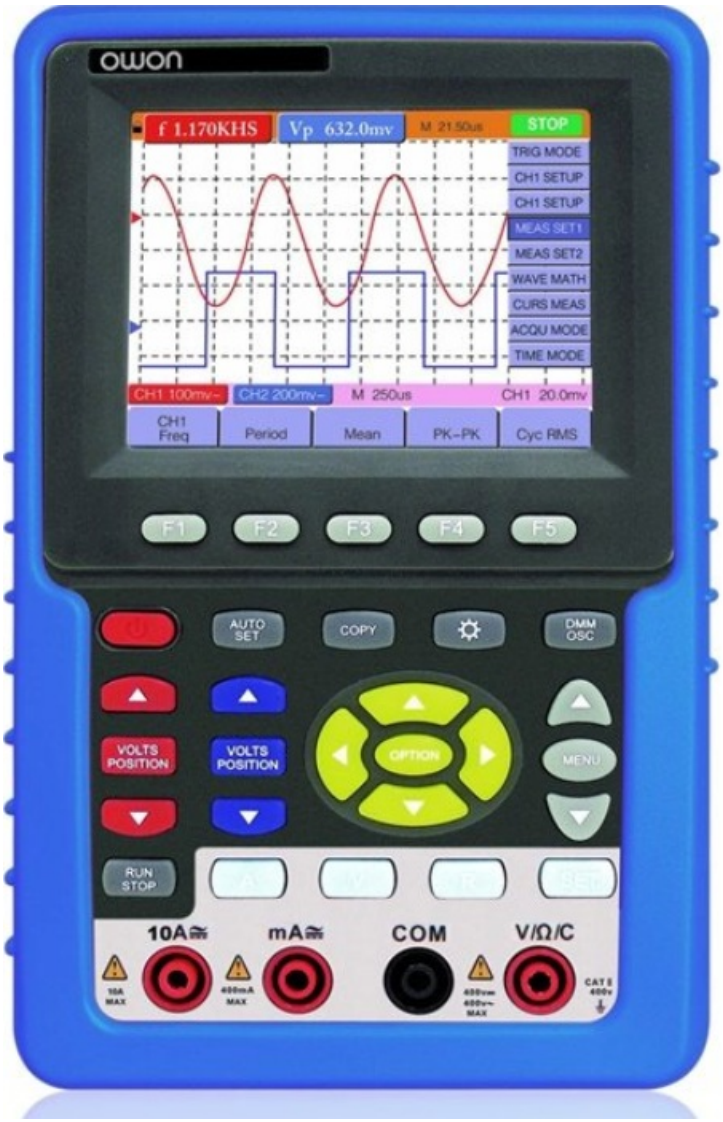

Product Information

Specifications

- Product: Multimeter SCPI Protocol
- Parameter Type: Bool
- Contact: OWON Service & Support Hotline: 4006 909 365

Introduction to the SCPI Language
The SCPI commands follow a hierarchical tree structure with root keywords and sub-keywords, allowing for parameter settings and queries.

Syntax
SCPI commands start with a colon (:) and use colons to separate keywords. Parameters are set after keywords with possible query indicated by a question mark (?) at the end of the command string.

Syntax Rules

- English words can be mnemonic keywords for commands.
- Mnemonics can be long or short based on specific rules.
- Space is used to separate commands and parameters.

- Colon (:) indicates root command or moving to the next level.

Product Usage Instructions

Multimeter SCPI Commands
To select the function of the multimeter, use the following SCPI commands:

- :FUNC DCV – Set multimeter to measure DC Voltage
- :FUNC ACV – Set multimeter to measure AC Voltage
- :FUNC DCA – Set multimeter to measure Direct Current
- :FUNC ACA – Set multimeter to measure Alternating Current
- :FUNC RES – Set multimeter to measure Resistance
- :FUNC DIOD – Set multimeter to measure Diode Voltage
- :FUNC BEEP – Enable the Buzzer of the multimeter
- :FUNC CAP – Set multimeter to measure Capacity

FAQ

Q: How do I contact for support?
A: For any problems or requirements, please contact OWON at the Service & Support Hotline: 4006 909 365.

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,** :VOLT:AC:AUTO {OFF|ON}

VOLT is the root keyword of the command. AC and AUTOare the second-level and third-level keywords respectively. The command string starts with ":" which separates the multiple-level keywords. {OFF|ON} represents parameters available for setting, "?" represents query and the command :VOLT:AC:AUTO and the parameter {OFF|ON} 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.

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 forth 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

- Bool
- The parameter could be” OFF”, ” ON”. For example,
- :VOLT:AC:AUTO {OFF|ON}
- wherein,
- <bool> can be set to {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.

Contact Us
If youhave any problem or requirement when using our products, please contact OWON.
Service& SupportHotline: 4006 909 365

The Entry ofthet hird party of programming
Support USB connecting. Open PC software, click DMM SCPI control icon, then the software sends command :SCPI:DISP? , if the device supports SCPI,then it will send back :SCPION . After receiving that command, the device will open DMM SCPI control interface. Ifthe device sends nothing, then a warning would pop up to tell youthe device does not support SCPI protocol.

ATTENTION: Due to DMM SCPI commands are comparatively easy. Here we just use abbreviation and send control command directly. Only one query command is provided for .reading data, that is :READ?

Multimeter SCPI Commands

Select the function of the multimeter

- :FUNC DCV set multimeter to measure DC Voltage
- :FUNC ACV set multimeter to measure AC Voltage
- :FUNC DCA set multimeter to measure Direct Current
- :FUNC ACA set multimeter to measure Alternating Current
- :FUNC RES set multimeter to measure Resistance
- :FUNC DIOD set multimeter to measure Diode Voltage
- :FUNC BEEP Enable the Buzzer of the multimeter
- :FUNC CAP set multimeter to measure Capacity

VoltageMeasurement

- :VOLT:AC:AUTO {OFF|ON} ACV automatic measurements
- :VOLT:DC:AUTO {OFF|ON} DCV automatic measurements
- :VOLT:AC:REL {ON|OFF} ACV relative value
- :VOLT:DC:REL {ON|OFF} DCV relative value

Measure Range

- DCV X1 -4V~4V :VOLT:DC:RANG 4
- X10 -40V~40V :VOLT:DC:RANG 40
- X100 -400V~400V :VOLT:DC:RANG 400
- X1000 -1000V~1000V :VOLT:DC:RANG 1000
- X100 -400mV~400mV :VOLT:DC:RANG 4E-1
- ACV X1 0~4V :VOLT:AC:RANG 4
- X10 0~40V :VOLT:AC:RANG 40
- X100 0~400V :VOLT:AC:RANG 400
- X1000 0~1000V :VOLT:AC:RANG 1000

CurrentMeasurement

- When “Manual” mode
    - :CURR:AC:AUTO {OFF|ON} ACA automatic measurements
    - :CURR:DC:AUTO {OFF|ON} DCA automatic measurements
    - :CURR:AC:REL {ON|OFF} ACA relative value
    - :CURR:DC:REL {ON|OFF} DCA relative value

Measure Range

- DCA mA :CURR:DC:UNIT mA
- X10 -40mA~40mA :CURR:DC:RANG 4E-2
- X100 -400mA~400mA :CURR:DC:RANG 4E-1
- DCA 10A :CURR:DC:UNIT 10A
- X1 -4A~4A :CURR:DC:RANG 4
- X10 -10A~10A :CURR:DC:RANG 10
- ACA mA :CURR:AC:UNIT mA
- X10 0mA~40mA :CURR:AC:RANG 4E-2
- X100 0mA~400mA :CURR:AC:RANG 4E-1
- ACA 10A :CURR:AC:UNIT 10A
- X1 0A~4A :CURR:AC:RANG 4
- X10 0A~10A :CURR:AC:RANG 10

Measure Resistance

- :RES:AUTO {OFF|ON} Resistance automatic measurements

Measure Range

- RES Ω :RES:RANG OHM
- KΩ :RES:RANG KOHM
- MΩ :RES:RANG MOHM

Measure Capacity

- :CAP:REL {ON|OFF}

Measure Diode Voltage

Enable Buzzer
Read Data
:READ?
Send :READ? to read the measured value of the current function. And the format of the data like this. DCV 0.300000V .

IEEE488.2 Common Commands

- **CLS**

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

  Set enable register for the standard event register set.

Parameter

Name	Type	Range	Default Value
<value>	Integer	0 to 255	0

Explanation
The bit 1 and bit 6 of the standard event register are not used and are always treated as 0, therefore, the range of <value> are the decimal numbers corresponding to the binary numbers ranging from 00000000 (0 in decimal) to 11111111 (255 in decimal) and of which the bit 1 and bit 6 are 0.
Definitions of the Bits in ESE Register:

Bit	weights	Name	Enable
7	128	PON	Power On
6 (Not used)	64	URQ	User Request
5	32	CME	Command Error
4	16	EXE	Execution Error
3	8	DDE	Dev. Dependent Error
2	4	QYE	Query Error
1 (Not used)	2	RQL	Request Control
0	1	OPC	Operation Complete

Return Format
The query returns an integer which equals to the sum of the weights of all the bits that have already been set in the register. For example, the query returns “144” if bit 4 (16 in decimal) and 7 (128 in decimal) are enabled.

Example
The command below enables bit 4 (16 in decimal) of the enable register.

ESE 16
The query below returns “16”.
*ESE?

ESE

Query which bit in ESE register is enabled.
Example
The command below enables bit 4 (16 in decimal) of the enable register.

- **ESE 16**

  The query below returns “16”.
- **ESE?**

ESR
Description
Query the event register for the standard event register set.

Parameter

Name	Type	Range	Default Value
<value>	Integer	0 to 255	0

Explanation
The bit 1 and bit 6 of the standard event register are not used and are always treated as 0, therefore, the query returns the decimal numbers corresponding to the binary numbers ranging from 00000000 (0 in decimal) to 11111111 (255 in decimal) and of which the bit 1 and bit 6 are 0.
Definitions of the Bits in ESE Register:

Bit	weights	Name	Enable
7	128	PON	Power On
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4	16	EXE	Execution Error
3	8	DDE	Dev. Dependent Error
2	4	QYE	Query Error
1 (Not used)	2	RQL	Request Control
0	1	OPC	Operation Complete

Return Format

The query returns an integer which equals to the sum of the weights of all the bits that have already been set in the register. For example, the query returns “144” if bit 4 (16 in decimal) and 7 (128 in decimal) are enabled.

Example
The query below returns “24” (bit 3 and bit 4 have already been set).
*ESR?

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
- <model> the model number of the instrument.
- <serial number> the serial number of the instrument.
- X.XX.XX the software version of the instrument.

Example
OWON,SDS6062,1247048,v3.0.2

OPC
Set the “Operation Complete” bit in the standard event register to 1 after the current operation is finished.

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.
- **SRE**

  Set enable register for the state byte register set.

Parameter

Name	Type	Range	Default Value
<value>	Integer	0 to 255	0

Explanation
The bit 0 and bit 1 of the state byte register are not used and are always treated as 0, therefore, the range of <value> are the decimal numbers corresponding to the binary numbers ranging from 00000000 (0 in decimal) to 11111111 (255 in decimal) and of which the bit 0 and bit 1 are 0.

Definitions of the Bits in SRE

Bit	Weights	Name	Enable
7	128	OPER	Operation Status Reg
6	64	—	Not used
5	32	ESB	Event Status Bit
4	16	MAV	Message Available
3	8	—	Not used
2	4	MSG	Message
1 (Not used)	2	USR	User
0 (Not used)	1	TRG	Trigger

Return Format
The query returns an integer which equals to the sum of the weights of all the bits that have already been set in the register. For example, the query returns “144” if bit 4 (16 in decimal) and 7 (128 in decimal) are enabled.

Example
The command below enables bit 4 (16 in decimal) of the enable register.

- **SRE 16**

  The query below returns “16”.

SRE?

- **STB**

  Query the condition register for the state byte register set.
- **TST**

  Perform self-test and return the test result.

  If the returned bit is “0”, the corresponding item of the instrument passed this test, while “1” indicates a failure.
- **WAI**

  Wait for the finish of the operation.

Documents / Resources

	owon HDS2062M-N Multimeter SCPI Protocol [pdf] Instructions HDS2062M-N, HDS2062M-N Multimeter SCPI Protocol, Multimeter SCPI Protocol, SCPI Protocol, Protocol

References

- User Manual