ONMEAS®

Rev.C3

AT2511

DC Resistanc Meter



User's Guide

Click to watch the operation video

Safety Notice

⚠Warning ⚠Danger:If any of the following abnormal conditions occurs, stop operation immediately and disconnect the power cord. Contact the Onmeas sales department immediately for repair. Otherwise, fire or a potential electric shock hazard to the operator may result.

- The instrument operates abnormally.
- The instrument produces abnormal noise, odor, smoke, or flashes during operation.
- The instrument generates high temperature or electric shock during operation.
- The power cord, power switch, or power socket is damaged.
- Foreign matter or liquid has entered the instrument.

Safety Information

⚠Warning⚠Danger: To avoid possible electric shock and ensure personal safety, follow the guidelines below during operation.

Disclaimer	Before using the instrument, please read the following safety information carefully. The Onmeas company shall not be liable for any personal injury or property loss caused by failure to comply with the following provisions.
Instrument Grounding	To prevent electric shock hazard, connect the power ground wire properly
Do Not Use the Instrument in Explosive Gas Atmospheres	Do not use the instrument in environments with flammable or explosive gases, vapors or heavy dust. Using any electronic equipment in such an environment is a risk to personal safety.
Do Not Open the Instrument Case	Non-professional maintenance personnel must not open the instrument enclosure in an attempt to repair the instrument. Charge that has not been fully discharged may remain inside the instrument for some time after it is switched off, which may cause an electric shock hazard to persons.
Do Not Use a Damaged Instrument	If the instrument has been damaged, the hazard is unpredictable. Disconnect the power cord; do not continue to use it and do not attempt to repair it yourself.
Do Not Use a Malfunctioning Instrument	If the instrument is not operating normally, the hazards are unpredictable. Disconnect the power cord, do not use the instrument again, and do not attempt to repair it yourself.
Do Not Use the Instrument Beyond the Methods Specified in This Manual	Beyond the specified scope, the protective measures provided by the instrument will become ineffective.

Limited Warranty and Limitation of Liability

Onmeas Ltd. (hereinafter referred to as Onmeas) warrants that every instrument you purchase is fully compliant in terms of quality and metrology. This warranty does not cover the fuse, nor damage caused by negligence, misuse, contamination, accident, or abnormal conditions of use. This warranty applies only to the original purchaser and is not transferable.

From the date of shipment, Onmeas provides one year of free warranty; this warranty also covers VFD or LCD. During the warranty period, damage to the instrument caused by improper operation of the user shall be repaired at the user’ s expense. After one years and for the lifetime of the instrument, Onmeas provides repair services on a charged basis. For the replacement of VFD or LCD, the fee is charged at the current cost price.

If the product is found to be damaged, please contact Onmeas to obtain approval and information for return or replacement. Then send the product to the dealer for return or replacement. Be sure to state the cause of the damage, and prepay the postage and the insurance to the destination. For the repair or replacement of a product within the warranty period, Onmeas will be responsible for the return shipping costs. For the repair of a product not covered by the warranty, Onmeas will provide an estimate of the repair costs, and the repair will be performed only after your consent has been obtained; all costs arising from the repair shall be borne by the user, including the return shipping costs.

This warranty is the sole warranty provided by Onmeas and constitutes your sole and exclusive remedy; apart from this, there are no other warranties, express or implied (including fitness for a particular purpose), and all other warranties are expressly disclaimed. Neither Onmeas nor any other dealer has made any oral or written representation to establish a warranty or to expand the scope of this warranty in any way. Onmeas shall not be liable for any special, indirect, incidental, or consequential damage or loss (including loss of data) arising from any cause outside the specifications. If any provision of this warranty conflicts with local laws and regulations, the local laws and regulations shall prevail, and therefore that provision may not apply to you; however, the determination of that provision shall not affect the validity and enforceability of the other provisions.

People's Republic of China
Jiangsu Province
Onmeas Ltd.
Rev.C0

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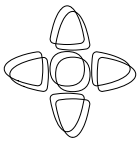
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1.Installation and Setup Guide



Thank you for purchasing our product! Please read this chapter carefully before use.

In this chapter, you will learn the following:

- Main Functions Packing List
- Power Requirements
- Fuse Replacement
- Operating Environment
- Cleaning

1.1 Packing List

Before formally using the instrument, please first:

1. Check the product appearance for damage, scratches or other defects;
2. Check the instrument accessories against the table below for anything missing;

Table 1- 1 Instrument Accessories

NAME	QTY.	REMARKS
User's Guide	1 copy	
Power cord	1 piece	220V/50Hz
Spare fuse	1 piece	0.5A slow-blow
ATL503 Kelvin test cable	1 set	
Verification report	1 copy	
Product certificate	1 sheet	
Warranty card	1 copy	

If there is damage or missing accessories, contact the Onmeas instrument sales department or your dealer immediately.

1.2 Power Requirements

The AT2511 series can only be used under the following power conditions:

Voltage: 198-252V AC

Frequency: 47.5-52.5Hz

Power: max. 15VA



Warning: To prevent electric shock hazard, connect the power ground wire properly
If the user replaces the power cord, make sure the ground of the power cord is reliably connected.

1.3 Fuse Replacement

There is 1 spare fuse among the supplied accessories.

The fuse is located on the rear panel of the instrument; refer to *Chapter 3 Operation Guide Rear Panel* section.



Note: use a 250V, 0.5A slow-blowFuses

1.4 Operating Environment

The AT2511 must be used under the following environmental conditions:

Temperature: 0°C~55°C,

Humidity: below 95%RH at 40°C

1.5 Cleaning

To prevent electric shock, unplug the power cord before cleaning.

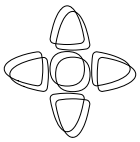
Use a clean cloth dampened with a little water to clean the case and panel.

Do not clean the inside of the instrument.



Note: Do not use solvents (such as alcohol or gasoline) to clean the instrument.

2.Overview



In this chapter you will learn the following:

- Introduction
- Model Description
- Main Specifications
- Main Features

2.1 Introduction

Thank you for purchasing the AT2511 DC low-resistance tester.

The AT2511 is an economical and practical DC low-resistance tester and an upgraded version of the AT511A.

Compared with its predecessor, the AT2511 offers a wider test range of 0.01mΩ~200.0kΩ with a maximum display of 5,000 counts. The test speed is also improved: up to 10 readings/second with stable readings. The improved fully automatic ranging test circuit, with an all-electronic switch design, can switch from the highest range to the lowest range instantly.

The AT2511/511C uses a 0.8-inch high-brightness LED display with Chinese keys and indicators, which makes the instrument display clearer; the intuitive operation interface is also easy to use.

The AT2511 has a built-in sorting function for upper/lower limit comparison.

The AT2511/511C features superior small-current testing and is especially suitable for resistances that are sensitive to the test current, such as platinum RTDs, copper RTDs, PTC ceramic thermistors, alloy-wire DC resistances and the DC resistance of current-protection devices.

The AT2511/511C is also suitable for measuring various contact resistances; the winding resistances of transformers, inductors, motors and deflection coils; wire resistances; the metal rivet resistances of vehicles, ships and aircraft; and the trace and through-hole resistances of printed circuit boards.

The AT2511+ features the newly upgraded RS232 communication interface and supports the SCPI communication protocol.

2.2 Model Description

To meet the needs of different users, the AT2511/511C series offers 2 models to choose from:

Model	Measurement Range	Range	Comparator	Accuracy	Communication
AT2511	0.01mΩ-200.0kΩ	8 ranges	Yes	0.2%	No
AT2511+	0.01mΩ-200.0kΩ	8 ranges	Yes	0.2%	RS-232

2.3 Main Specifications

The AT2511 technical specifications include the basic technical specifications of the instrument and the ranges allowed for instrument testing. These specifications are what the instrument can achieve at the factory.

Reference: For complete technical specifications, refer to Chapter 4.

- Basic accuracy: 0.2%
- Max. 5,000-count display digits
- 8-range automatic or manual testing
- Provides a test range of 0.01mΩ~200.0kΩ. All-electronic switch control, no life limit, instant range switching.

Test speed:

- Fast: 10 readings/second Slow: 3 readings/second
- Enhanced impact protection
- Back-EMF surge protection.

2.4 Main Features

- 0.8-inch large-character high-brightness LED display
- Fully Chinese keys and indicators.
- Fully automatic testing with a manual range function
- Comparator function
- Full-range short-circuit zeroing function

3.Operating Guide

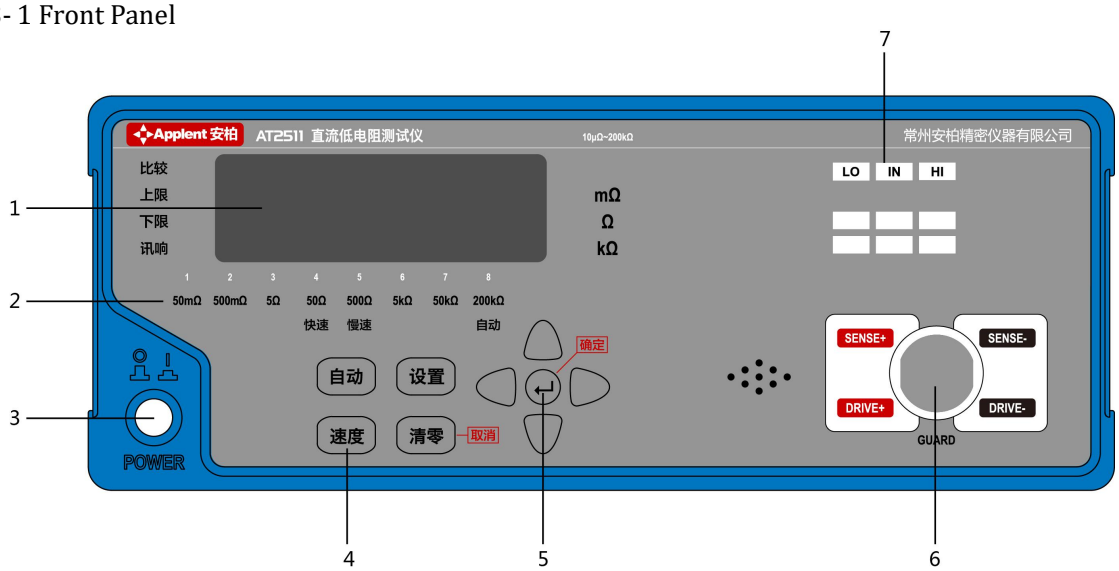
In this chapter you will learn the following:

- Getting to know the front panel — introduction to the keys, display and test terminals.
- Rear panel — introduces the power supply and interface information.
- Powering up — including the power-on self-test process and the instrument warm-up time.
- Starting a test — including how to connect to the test terminals and instrument function settings.

3.1 Getting to Know the Front Panel

3.1.1 Front Panel Description

Figure 3- 1 Front Panel



1	Display window: 0.8-inch LED display of measurement results
2	Function indicators: range number, speed and range-auto indicators
3	Power switch: pressed = on; released = off.
4	Function keys
5	Direction keys
6	DUT terminals
7	Comparator indicators (not available on AT511C)

3.1.2 Keypad

Auto Selects auto or manual ranging.
When the AUTO indicator is on, auto ranging is active.

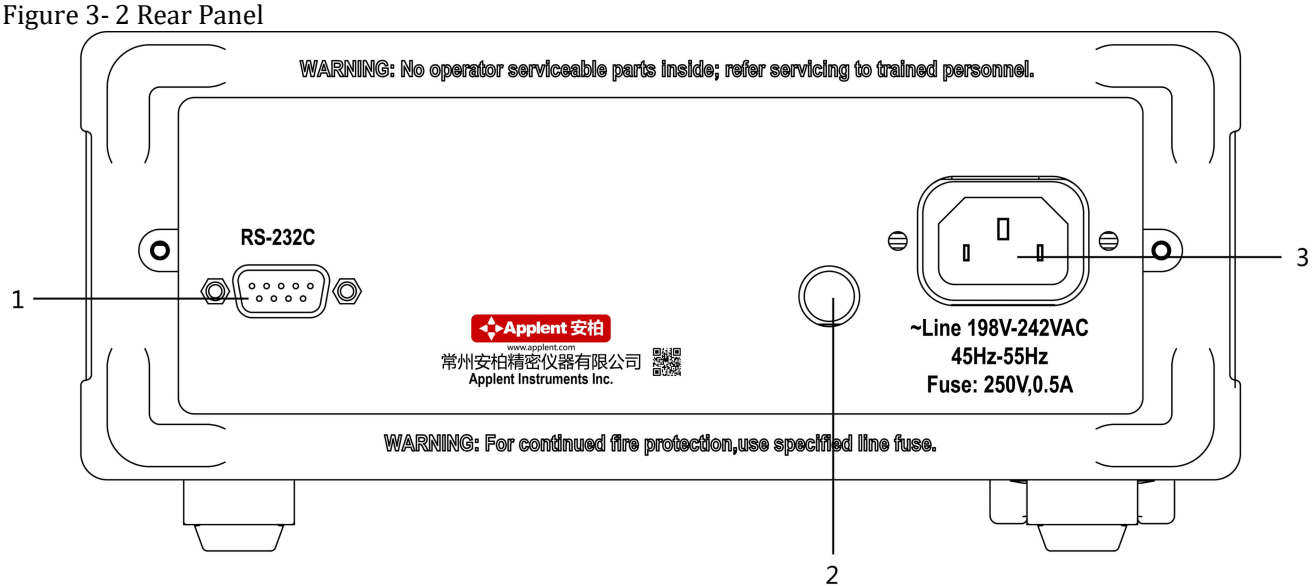
Speed Selects the test speed.

Setup Comparator setup menu (AT2511).

Zero Performs short-circuit zero calibration.

3.1.3 Rear Panel Description

Figure 3- 2 Rear Panel



1	RS232C. Reserved port; not used in this version.
2	Fuse holder. Uses a 250V, 0.5A fuse.
3	Power socket. Uses mains power 198V~242VAC, 45Hz~55Hz

3.2 Powering Up

3.2.1 Power On

The key marked "+" at the lower left of the panel is the power switch.

 Power on.  Power off.

3.2.2 Warm-up Time:

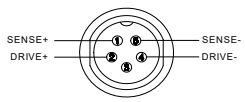
To achieve the specified accuracy, the instrument needs to warm up for at least 15 minutes.

3.3 Starting a Test

3.3.1 Connecting the Test Terminals

Insert the test head into the test port correctly along the slot direction. Ensure good contact.

Figure 3- 3 Test Terminal Pin Definitions



To ensure the accuracy the instrument can achieve, use the supplied "Kelvin" test clips for testing. Warning: It is strictly forbidden to connect current sources or voltage sources directly to the test terminals. Connect energy-storage components to the test terminals only after they are discharged.

3.4 Selecting the Test Speed

The instrument provides 2 speeds for selection:
Slow: 3 readings/second
Fast: 10 readings/second
Press the Speed key to switch the speed; the corresponding indicator shows the current speed.

3.5 Selecting the Test Range

In auto range modeAutoindicator lights up, and the range indicator shows the current range. The AT2511 automatically selects the most suitable range for measurement according to the table below:

Table 3- 2 Range Number, Range Resistance and Range Transitions

Range number	Range		
1	50mΩ	50mΩ ↓ 500mΩ ↓ 5Ω ↓ 50Ω ↓ 500Ω ↓ 5kΩ ↓ 200kΩ	49mΩ ↑ 490mΩ ↑ 4.9Ω ↑ 49Ω ↑ 490Ω ↑ 4.9kΩ ↑ 49kΩ
2	500mΩ		
3	5Ω		
4	50Ω		
5	500Ω		
6	5kΩ		
7	50kΩ		
8	200kΩ		

Press the Auto key to switch between auto ranging and range hold.

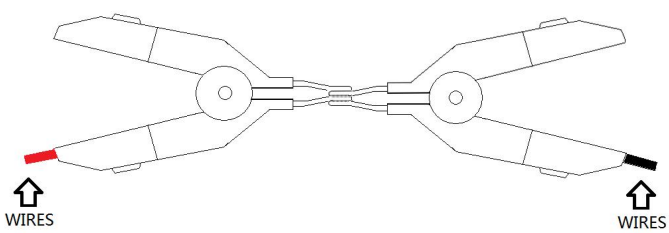
Tip:
- Using manual ranging can effectively increase the test speed.
- If the instrument fails to select the range properly in auto range mode, perform zero calibration.
- For the zero calibration operation, see the "Zero Calibration" section.

3.6 Zero Calibration

For high-accuracy measurement, zero calibration is required.

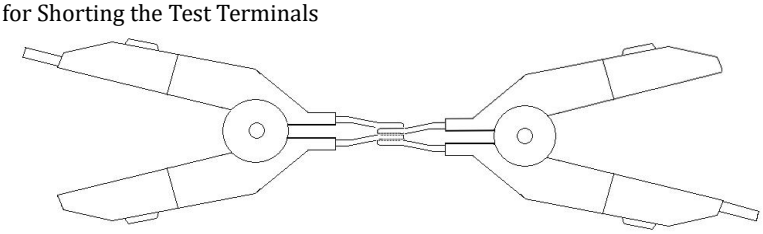
1. Press the Zero key to enter the zeroing standby screen. Before starting zeroing, short the test clips as follows.

Figure 3- 4 Correct Method for Shorting the Test Terminals



The following example is incorrect!

Figure 3- 5 Incorrect Method for Shorting the Test Terminals



2. Press Cancel to exit zeroing, or press OK to start zeroing. The instrument performs zeroing for all ranges.

3. If zeroing succeeds, the zeroing data is saved in non-volatile memory.

Tip:

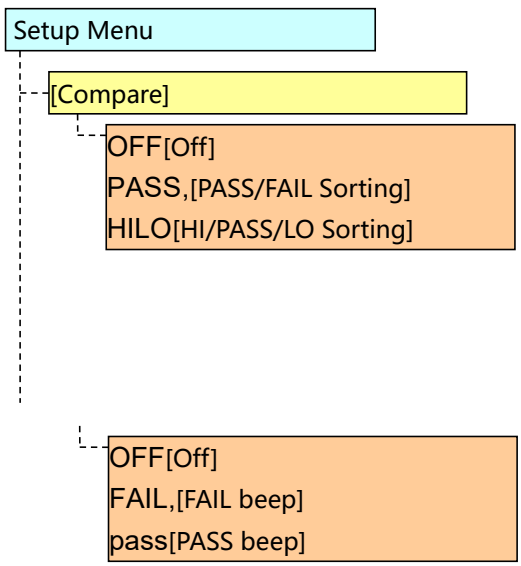
To achieve the accuracy specified for the instrument, we recommend that the user perform zeroing after warm-up and before use.
When using the instrument after a drastic temperature change, we recommend performing zeroing.
When using the instrument after an environment change, we recommend performing zeroing.

3.7 Setup Menu

The AT2511 has a built-in upper/lower limit comparator. The comparator function is enabled in the setup menu, where the upper/lower limits are set and the beeper indication is turned on.

Press the Setup key to enter the setup menu:

Figure 3- 6 Setup Menu



3.7.1 Enabling the Comparator

The comparator has 2 comparison modes:

1. PASS/FAIL comparison. In this mode the instrument has only 2 status indications: exceeding the upper/lower limits is judged FAIL, and within the limits is indicated PASS.
2. HI/PASS/LO comparison. In this mode the instrument provides 3 status indications: HI (over the upper limit), PASS and LO (under the lower limit).

Steps for enabling the comparator:

Step 1 Press the Setup key to enter the setup menu;

Step 2 Press the OK key to enter the compare menu;

Step 3 Use the Up/Down keys to select

Option	Function
OFF	Comparator off; the beeper and comparator indicators are turned off at the same time.

PASS	Both comparator modes are indicated at the same time.
HILO	Only HI/PASS/LO comparison is used. The PASS/FAIL indicators are turned off.

Step 4 Press the OK key to save the parameters and return to the setup screen.
or press Cancel key to cancel the current setting and return to the setup screen.

3.7.2 Upper and Lower Limit Settings

If the comparator is set to on, the correct comparator upper/lower limit values must be set.

Steps for setting the comparator upper/lower limits:

Step 1 Press the Setup key to enter the setup menu;

Step 2 Press the Up/Down keys to select the corresponding upper or lower limit menu;

Step 3 Press Enter key to enter the input screen.

Step 4 Use the Left/Right keys to position the digit, decimal point and unit
Use the Up/Down keys to change the value, decimal point position and unit

Step 5 Press the OK key to save the parameters and return to the setup screen.
or press Cancel key to cancel the current setting and return to the setup screen.

3.7.3 Beeper Settings

The instrument has 2 beeper modes: FAIL beep and PASS beep.

Steps for setting the beeper:

Step 1 Press the Setup key to enter the setup menu;

Step 2 Press the Up/Down keys to select the beeper menu;

Step 3 Press the OK key to enter the compare menu;

Step 4 Use the Up/Down keys to select

Option	Function
OFF	Beeper off.
FAIL	FAIL beep.
PASS	PASS beep.

Step 5 Press the OK key to save the parameters and return to the setup screen.
or press Cancel key to cancel the current setting and return to the setup screen.

3.7.4 How the Comparator Works

When the comparator is on, the current measured value is compared with the upper limit value and the lower limit value.

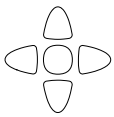
Sorting process:

Lower limit < current value < upper limit Product PASS Displays IN (PASS)

Current value ≤ lower limit Product under limit (FAIL) Displays LO (FAIL)

Current value ≥ upper limit Product over limit (FAIL) Displays HI (FAIL)

4.Remote Communication



In this chapter you will learn the following:
About the RS-232 Interface
RS-232 connection.
Software protocol.

The AT2511+ can use the built-in RS-232 interface to communicate with a computer and complete all instrument functions. With standard SCPI commands, the user can also conveniently develop various acquisition systems suited to their needs.

4.1 About the RS232C Interface

RS-232 is a serial communication standard widely used today, also called the asynchronous serial communication standard, used for data communication between computers and between computers and peripherals. RS is the English abbreviation of "Recommended Standard" (recommended standard), and 232 is the standard number. This standard was officially published in 1969 by the Electronic Industries Association (EIA) of the United States; it specifies that data is transmitted one bit at a time over a single data line.

The AT2511+ uses the minimum subset of RS232:

Table 4- 1 Minimum Subset of the RS-232 Standard

Signal	Symbol	9-pin connector pin number
Transmitted Data	TXD	2
Received Data	RXD	3
Ground	GND	5

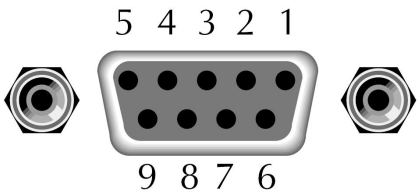
4.2 RS232C Connection

The RS-232 serial interface can be interconnected with the serial interface of a controller (for example, a personal computer or an industrial computer) through a straight-through DB-9 cable.



Note: The instrument cannot use a null modem cable.
You can make it yourself, or purchase a 9-core cable from Onmeas.
Note the following for a user-made 3-wire cable:
The computer-side DB-9 connector (male) pins 4-6 and 7-8 must be shorted.
The cable length should not exceed 2m.

Figure 4-1
RS232 interface



Recommendation: To avoid electric shock, turn off the power of the instrument when plugging or unplugging connectors.

- Default communication settings of the instrument:

Transmission mode: full-duplex asynchronous communication with start and stop bits
Baud rate: 9600bps.
Data bits: 8 bits
Stop bits: 1 bit
Parity: None

4.2.1 Enabling RS-232 Communication

The RS-232 of the instrument is enabled automatically at power-on; no parameter setting is required.

4.2.2 Handshaking Protocol

Since the 2511+ uses the minimum subset of the RS-232 standard with software handshaking, high-level language software engineers should strictly follow the handshake protocol below when developing computer communication software:

Reference: The syntax and format of SCPI command strings are described in detail in the "SCPI Command Reference" chapter.

- The AT2511+ command parser only accepts ASCII format, and command responses also return ASCII codes.
- The command string sent by the host must end with NL ('\n', hexadecimal 0AH); the command parser starts executing the command string only after receiving the terminator.

Tip: If the host computer cannot receive the data returned by the instrument, you can try the following methods to resolve the problem:

1. The software handshake is turned off; use the SCPI command "err:tip on" to turn it on.
2. Serial port connection fault; check the cable connections.
3. The communication format of the high-level language program on the computer side is incorrect. Try checking whether the serial port number and the communication format are correct, and whether the baud rate is the same as that set on the instrument.
4. If the instrument is parsing the previous command, the host computer cannot receive a response from the instrument either; please wait and try again.

<If the problem still cannot be solved, consult an Onmeas technical engineer immediately>

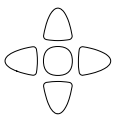
4.2.3 SCPI Language

SCPI — Standard Commands for Programmable Instruments — is a universal command set for test instruments adopted by Onmeas. SCPI, also called TMSL (Test and Measurement System Language), was developed by Agilent Technologies as an extension of IEEE488.2 and

has been widely adopted by test equipment manufacturers.

Reference: The built-in command parser of the AT2511+ is responsible for parsing the user’s various command formats. Since the AT2511+ command parser follows the SCPI protocol but is not fully SCPI-consistent, please read the “SCPI Command Reference” chapter carefully before starting work.

5.SCPI Command Reference



This chapter includes the following topics:

- Command Parser — understand some rules of the command parser.
- Command Syntax — rules for writing command lines
- Query Syntax — rules for writing query commands
- Query Response — format of the query response
- Command Summary

This section provides all SCPI commands used by the AT2511; with these SCPI commands, all instrument functions can be fully controlled.

5.1 Command String Parsing

The host computer can send a string of commands to the instrument, and the command parser of the instrument starts parsing after detecting the terminator (\n) or an input buffer overflow.

Example:

Valid command string:

comp:tol 1m,10m;:rang 3;

The command parser is responsible for parsing and executing all commands; before writing programs you must first understand its parsing rules.

Command parser parsing rules:

1. The command parser only parses and responds to ASCII code data.
2. The command parser input buffer is 60 bytes; excess bytes are ignored.



Tip: due to the input buffer limit of the command parser, it is recommended to use the abbreviated format for longer command strings.

3. The SCPI command string must end with NL ('\n' , hexadecimal 0AH); the command parser starts executing the command string only after receiving the terminator or when the buffer overflows.



Tip: the command parser does not report an error on input buffer overflow, but it can cause execution errors for commands at the buffer edge; pay attention to controlling the command string length.

4. When the parser detects an error, it returns an error message and terminates this parse; the input buffer is cleared and the string after the error is ignored.
5. When the parser parses a query command (ending with ?), it terminates this command string parse and the following strings are ignored.



Note: The query command can only be placed at the end of the command string.

6. The command parser is not case-sensitive when parsing command strings.
7. The command parser supports abbreviated command forms; for the abbreviation specifications, refer to the following chapters.

5.2 Symbol Conventions and Definitions

This chapter uses some symbols; these symbols are **not** part of the command tree; they are only intended to aid understanding of command strings.

<> The text in angle brackets indicates the parameter of the command

[ ] The text in square brackets indicates an optional command

{} **When the braces enclose several parameter items, it indicates that only one of the items may be selected.**

( ) The abbreviated form of a parameter is placed in parentheses.

Uppercase letters The abbreviated form of the command.

\n ASCII line feed, decimal 10. Here it denotes the command string terminator.

5.3 Commands and Parameters

A command tree consists of a command and [parameters], separated by 1 space (ASCII: 20H).

Example: comp:tol 1m,100m

Command [Parameters]

5.3.1 Commands

Command words can be in long form or abbreviated form. The long form makes it easier for engineers to understand the meaning of the command string; the abbreviated form is convenient for writing.

5.3.2 Parameters

- A command with a single command word and no parameters.
- For example: idn?, sav
- The parameter can be in the form of a string, and its abbreviation rules still follow the "command abbreviation rules" in the previous section.
- For example: rang:auto on
- The parameter can be a numeric value; three formats are supported.
  - 〈integer〉: integer
  - For example: 123, +123, -123
  - 〈float〉: floating point

    The command parser supports both floating-point formats:

    1. Standard floating point: for example: 1.23, -1.23, 1.23E+4, +1.23e-4
    2. Floating point with multiplier: for example, 1.23k, 1.23M, 1.23G, 1.23

Table 5- 1 Numeric Values and Multipliers

Numeric value	Multiplier
1E18 (EXA)	EX
1E15 (PETA)	PE
1E12 (TERA)	T
1E9 (GIGA)	G

1E6 (MEGA)	MA
1E3 (KILO)	K
1E-3 (MILLI)	M
1E-6 (MICRO)	U
1E-9 (NANO)	N
1E-12 (PICO)	P
1E-15 (PEMTO)	F
1E-18 (ATTO)	A

Tip: The multipliers are not case-sensitive, and their notation differs from the standard names.

5.3.3 Separators

The command parser only accepts the allowed separators; for any other separator the parser reports the "Invalid separator" error. These separators include:

; Semicolon, used to separate two commands.

Example: comp:res 100G;stat:char

: Colon, used to separate command trees or to restart the command tree.

Example: comp:beep:set ng;:comp:res 100G

? Question mark, used for queries.

Example: stat?

, Comma, separates multiple parameters

□ Space, used to separate parameters.

Example: comp:tol□1m,100m

5.4 Error Messages

Error Messages	Description
Bad command	Command error. For example: spelling error
Parameter error	Parameter error For example: parameter spelling error
Missing parameter	Missing parameter
Invalid separator	Invalid separator
Numeric data error	Numeric value error Example: Send> comp:tol 1m,100mm Return> '100mm' Numeric data error.
Invalid command	Invalid command; the command is forbidden in certain states.
Value string too long	Numeric string too long; do not exceed 20 characters For example: Send> comp:res 1.2345678901234567890e2 Return> '1.2345678901234567890e2' Numeric data error

5.5 Command Summary

All commands are interpreted in subsystem command order; all subsystems used by the AT2511 are listed below.

- RANGe Range subsystem
- APERture Speed subsystem
- COMParator Comparator subsystem
- BEEP Beeper subsystem
- ERRor Error information subsystem
- FETCh? Result acquisition subsystem

Common commands:

- *IDN? Instrument information query subsystem
- *SAV Saves the setup parameters to Flash



Convention: each subsystem is described using the same template:

1. Subsystem command name
2. Command tree (under the subsystem command)
3. Subcommand name
4. Command description
5. Command syntax
6. Example illustrating the command syntax
7. Query syntax
8. Query response
9. Example illustrating the query syntax
10. Restrictions

5. 6 RANGe Range Subsystem

Figure 5- 1 RANGe Subsystem Tree

RANGe	[NO]	{0, 1, 2, 3, 4, 5, 6, 7}
	AUTO	{ON, OFF}

5.6.1 RANGe[:NO] Range Setting

Command syntax	RANGe[:NO] {0-7}
Parameters	where {0-7}: range number
For example	Send> RANG 4 //Switch to range 4
Query syntax	RANG?
Query response	Range number 1~7
Example	Send> RANGE? Return> 4

5.6.2 RANG:AUTO Range Auto

Command syntax	RANGe:AUTO {ON,OFF,1,0}

Parameters	ON or 1: on OFF or 0: off
For example	Send> RANG:AUTO 0 //Range locked
Query syntax	RANG:AUTO?
Query response	{1,0}
Example	Send> RANG:AUTO? Return> 1 //Auto ranging

5.7 COMP Comparator Subsystem

Figure 5- 2 COMP Subsystem Tree

COMP		{OFF, PASS, HILO}
	TOL	<lower float>,<upper float>

5.7.1 COMP Status Setting

Command syntax	COMP {OFF,PASS,HILO}
Parameters	OFF: comparator off PASS: PASS/FAIL comparison HILO: HI/LO comparison
For example	Send> COMP PASS //PASS/FAIL comparison
Query syntax	COMP?
Query response	{OFF,PASS,HILO}
Example	Send> COMP? Return> pass

5.7.2 COMP:TOL Upper and Lower Limit Setting

Command syntax	COMP:TOL <lower float>,<upper float>
Parameters	<lower float>: lower limit value, floating point in any form: 1m, 1E-3, 0.001 <upper float>: upper limit value
For example	Send> COMP:TOL 1m,10m //Set the lower limit to 1m and the upper limit to 10m
Query syntax	COMP:TOL?
Query response	<scientific notation float>,<scientific notation float>
Example	Send> COMP:TOL? Return> 1.000e-3,1.000e-2

5.8 APER Speed Subsystem

Figure 5- 3 APER Subsystem Tree

APER		{SLOW, FAST}

5.8.1 APER Speed Setting

Command syntax	APER {SLOW,FAST}
Parameters	SLOW: slow FAST: fast
For example	Send> APER SLOW
Query syntax	APER?

Query response	{SLOW,FAST}
Example	Send> APER? Return> fast

5.9 BEEP Beeper Subsystem

Figure 5- 4 BEEP Subsystem Tree

BEEP		{OFF, PASS, FAIL}

5.9.1 BEEP Beeper Setting

Command syntax	BEEP {OFF,PASS,FAIL}
Parameters	OFF: beeper off PASS: PASS beep FAIL: FAIL beep
For example	Send> BEEP PASS //PASS beep
Query syntax	BEEP?
Query response	{OFF,PASS,FAIL}
Example	Send> BEEP? Return> off

5.10 FETCh? Measurement Retrieval Subsystem

Figure 5- 5 FETCh? Subsystem Tree

FETCh?		<float>[, {PASS, FAIL, NGHI, NGLO}]

5.10.1 FETCh? Retrieving Measurement Results

Query syntax	FETCh?
Query response	<float>[, {PASS, FAIL, NGHI, NGLO}] Measured value: scientific notation When the comparator is set to PASS, PASS (pass) or FAIL (fail) is returned as well When the comparator is set to HILO, PASS (pass), NGLO (under) or NGHI (over) is returned as well
Example	Send> FETC? Return> +1.005e+00,FAIL //When the comparison status is PASS Send> FETC? Return> +1.005e+00,NGLO //When the comparison status is HILO Send> FETC? Return> +1.005e+00 //When the comparison status is OFF

5.11 *IDN? Querying the Instrument Model and Version

Query syntax	*IDN?
Query response	2511, -C3-, 0nmeas Model, version, company

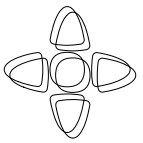
5.12 *SAV Saving Setup Parameters

Parameters sent via commands are not saved to the instrument Flash; they must be saved with the SAV command.

If the set parameters should still take effect at the next power-on, be sure to execute the SAV command.

Command syntax	*SAV
Parameters	No parameter
For example	Send> SAV

5.Specifications



In this chapter you will learn the following:

- Technical specifications.
- General specifications.
- Dimensions.

5.1 Technical Specifications

The following data are measured under the following conditions:
Temperature: 20℃±5℃
Humidity: ≤80% R.H.
Zero adjustment: zeroing before testing
Warm-up time: >60 minutes
Calibration interval: 6 months

Sampling rate: slow (about 3 readings/second)
Test current accuracy: 10%

Table 5-1 AT2511/2511+ Specifications Table

Range		Max. display	Resolution	Accuracy	Test current	Test terminal open-circuit voltage
1	**50mΩ**	50.0mΩ	10μΩ	0.2%+5 counts	100mA	<0.7V
2	**500mΩ**	500.0mΩ	100μΩ	0.2%+3 counts	100mA	<0.7V
3	**5Ω**	5.000Ω	1mΩ	0.2%+2 counts	100mA	<3V
4	**50Ω**	50.00Ω	10mΩ	0.2%+2 counts	10mA	<3V
5	**500Ω**	500.0Ω	100mΩ	0.2%+2 counts	1mA	<3V
6	**5kΩ**	5.000kΩ	1Ω	0.2%+2 counts	100μA	<3V
7	**50kΩ**	50.00kΩ	10Ω	0.2%+3 counts	10μA	<3V
8	**200kΩ**	200.0kΩ	100Ω	0.2%±5 counts	10μA	<3V

5.2 General Specifications

Measurement range: 0.01mΩ~200.0kΩ
Min. resolution: 0.01mΩ
Max. reading: 5000
Range: auto and manual.
Test speed: slow: 3 readings/second fast: 10 readings/second
Zeroing: full-range short-circuit zeroing.
Test terminals: 4-terminal testing.
Communication interface: RS-232 (AT2511+)
Communication protocol: SCPI (AT2511+)

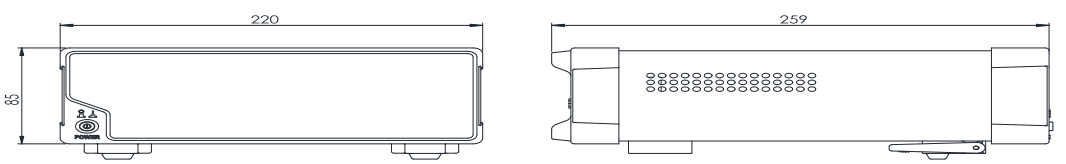
Power: 198V~252VAC48.5Hz~52.5Hz
Fuse: 0.5A slow-blow
Power consumption: Max. 15VA

Dimensions: 220mm×85mm×259mm
Weight: Approx. 2kg.
Environment: Rated: temperature 15℃~35℃ humidity <80% RH
Operating: temperature 10℃~40℃ humidity 10~90% RH
Storage: temperature 0℃~50℃ humidity 10~90% RH

Accessories: User’s Guide, ATL503 4-terminal Kelvin cable, AC power cord, verification report, warranty card and spare fuse.

5.3 Dimensions

Figure 5- 2 Dimension Drawing



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