TECHMIZE by TONGHUI

CMD

SCPI COMMAND REFERENCE

TH1953 / TH1963 / TH1963A Series

Companion document to the TH1953/TH1963/TH1963A Series Operation Manual. Full SCPI command syntax, parameters and examples for all 17 subsystems (≈114 commands) implemented on this series.

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Rev. 2026-10

Introduction & Syntax Conventions

This document is the companion SCPI command reference for the TH1953/TH1963/TH1963A Series Operation Manual (see that manual's Chapter 8 for interface setup and the subsystem overview).

Syntax conventions

- SCPI commands use a hierarchical ("tree") structure: `SENSe:VOLTage:DC:RANGe {<range>|MIN|MAX|DEF}` — `SENSe` is the root keyword, `VOLTage` the second-level keyword, `DC` the third-level keyword, separated by colons.
- Most commands and parameters mix upper- and lower-case letters; the upper-case letters are the short form. `VOLTage` can be sent as `VOLT` or `VOLTage` (any case) — other abbreviations (e.g. `VOL`, `VOLTAG`) produce an error.
- Braces `{ }` enclose parameter choices and are not sent as part of the command string.
- A vertical bar `|` separates parameter alternatives, e.g. `{<range>|MIN|MAX|DEF}`.
- Angle brackets `< >` mark a parameter that must be given an actual value — the brackets themselves are not sent.
- Square brackets `[ ]` mark an optional keyword or parameter; if omitted, the instrument uses its default value.
- A colon (`:`) separates consecutive keywords; a semicolon (`;`) separates two commands within the same subsystem in one line, e.g. `TRIG:SOUR EXT;COUNT 10`.
- Numeric parameters accept standard decimal notation (optional sign, decimal point, scientific notation) plus the special values `MIN`, `MAX` and `DEF`, and may take an SI-style unit suffix (e.g. `M`, `k`, `m`, `u`). Because the parser does not distinguish upper/lower case, use `MA` for mega and `u` for micro to avoid ambiguity.
- Discrete parameters select from a fixed list (e.g. `IMMediate`, `EXTernal`, `BUS`) and may also be sent in short or long form.
- Boolean parameters accept `ON`/`1` (true) or `OFF`/`0` (false); a query always returns `0` or `1`.
- String parameters are enclosed in matching single or double quotes, e.g. `DISPlay:TEXT "WAITING..."`.
- Appending `?` to a command queries its current value, e.g. `TRIG:COUN?`. Most settable parameters can also be queried as `MIN` or `MAX` to find the allowed range, e.g. `TRIG:COUN? MAX`.
- Terminate every command line with a newline — otherwise the instrument may fail to parse the command correctly.

> **NOTE**
> SCPI and MODBUS are standard protocol support across the full series on the applicable interfaces (see Operation Manual §7); neither is exclusive to a specific model.

Document structure

Commands are grouped by subsystem, matching the Operation Manual's §8.1 overview table. Each entry gives: description, syntax, parameters, and a worked example with typical response (where applicable).

SUBSYSTEM 1 / 17

CONFigure

Configures the instrument for a measurement function in a single command, setting all measurement and trigger parameters to their default values (see table below). CONFigure commands do not start a measurement — use `INITiate`, `READ?` or `FETCh?` to trigger and read.

Parameter	Default
AC input filter (bandwidth)	20 Hz (medium filter)
Auto zero	Off if resolution setting makes NPLC<1; On if NPLC≥1
Range	AUTO (including the voltage range used for frequency/period)
Samples per trigger / trigger count	1 / 1
Trigger delay / source	Auto delay / Immediate
Trigger slope	NEGative
Math function / Null per-function state	Disabled (other parameters unchanged) / Disabled

Command	Description, parameters & example
`CONFigure?`	Returns a quoted string with the current function, range and resolution. Example: `CONF?` → `DCI,1.00000000E-04,1.00000000E-09`
`CONFigure[:VOLTage]:DC [{<range>|AUTO|MIN|MAX|DEF}]`	Configure DC voltage measurement. Range: {100m|1|10|100|1000}, default AUTO. Example: `CONF:VOLT:DC 100`
`CONFigure[:VOLTage]:AC [{<range>|AUTO|MIN|MAX|DEF}]`	Configure AC voltage measurement. Range: {100m|1|10|100|750}, default AUTO. Example: `CONF:VOLT:AC 100`
`CONFigure:CURRent:DC [{<range>|AUTO|MIN|MAX|DEF}]`	Configure DC current measurement. Range: {100µA|1mA|10mA|100mA|1A|3A|10A}, default AUTO. Example: `CONF:CURR:DC 100m`
`CONFigure:CURRent:AC [{<range>|AUTO|MIN|MAX|DEF}]`	Configure AC current measurement. Same range set as above, default AUTO. Example: `CONF:CURR:AC 100m`
`CONFigure:CONTinuity`	Configure continuity measurement. No parameters. Example: `CONF:CONT`
`CONFigure:DIODe`	Configure diode measurement. No parameters. Example: `CONF:DIOD`
`CONFigure:RESistance [{<range>|AUTO|MIN|MAX|DEF}]`	Configure 2-wire resistance measurement. Range: {10|100|1k|10k|100k|1MA|10MA|100MA}, default AUTO. Example: `CONF:RES 10MA`
`CONFigure:FRESistance [{<range>|AUTO|MIN|MAX|DEF}]`	Configure 4-wire resistance measurement. Same range set, default AUTO. Example: `CONF:FRES 10MA`
`CONFigure:FREQuency [{<range>|MIN|MAX|DEF}]`	Configure frequency measurement. Range (input voltage): {100m|1|10|100|750}, default AUTO. Example: `CONF:FREQ 10`
`CONFigure:PERiod [{<range>|MIN|MAX|DEF}]`	Configure period measurement. Same range set, default AUTO. Example: `CONF:PER 10MA`
`CONFigure:TEMPerature [{FRTD|RTD|FTHermistor|THERmistor}]`	Configure temperature measurement. Parameter: probe type. Example: `CONF:TEMP RTD`
`CONFigure:CAPacitance [{<range>|AUTO|MIN|MAX|DEF}]`	Configure capacitance measurement. Range: {1n|10n|100n|1u|10u|100u|1m|10m}, default AUTO. Example: `CONF:CAP 10u`

SUBSYSTEM 2 / 17

MEASure

A `MEASure?` query selects function/range in a single command **and** immediately triggers a measurement, sending the result back to the host — equivalent to `CONFigure` followed immediately by `READ?`. All other measurement and trigger parameters are set to their default (see the CONFigure defaults table).

Command	Description, parameters & example
`MEASure:VOLTage:{AC|DC}? [{<range>|AUTO|MIN|MAX|DEF}]`	AC range: {100m|1|10|100|750}; DC range: {100m|1|10|100|1000}; default AUTO. Example: `MEAS:VOLT:DC? 100` → `+8.53210000E+1`
`MEASure:CURRent:{AC|DC}? [{<range>|AUTO|MIN|MAX|DEF}]`	Range: {100u|1m|10m|100m|1|3|10}, default AUTO. Example: `MEAS:CURR:DC? 10` → `+8.53210000E+01`
`MEASure:CONTinuity?`	No parameters. Example: `MEAS:CONT?` → `+8.53210000E+00`
`MEASure:DIODe?`	No parameters. Example: `MEAS:DIOD?` → `+8.53210000E+00`
`MEASure:{RESistance|FRESistance}? [{<range>|AUTO|MIN|MAX|DEF}]`	Range: {10|100|1k|10k|100k|1MA|10MA|100MA}, default AUTO. Example: `MEAS:FRES? 100` → `+8.53210000E+01`
`MEASure:{FREQuency|PERiod}? [{<range>|AUTO|MIN|MAX|DEF}]`	Range (voltage input range of the counter's AC front end, not a frequency range): {100m|1|10|100|750}, default AUTO. Example: `MEAS:FREQ? 10` → `+1.4527800E-04`
`MEASure:TEMPerature? [{FRTD|RTD|FTHermistor|THERmistor}]`	Parameter: probe type. Example: `MEAS:TEMP? RTD` → `+8.53210000E+1`
`MEASure:CAPacitance? [{<range>|AUTO|MIN|MAX|DEF}]`	Range: {1n|10n|100n|1u|10u|100u|1m|10m}, default AUTO. Example: `MEAS:CAP? 10u` → `+8.53210000E-06`

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TRIGger

Command	Description, parameters & example
`ABORt`	Cancels any measurement in progress and returns the instrument to the trigger-idle state. No parameters. Example: `ABORt`
`INITiate`	Changes the trigger system from Idle to Wait-for-Trigger, clearing the previous reading set from memory first. Up to 10,000 readings can be stored; the buffer wraps, always keeping the newest readings. Retrieve with `FETCh?`. No parameters.
`FETCh?`	Waits for the measurement to complete and sends all available readings; does not clear the reading memory, so it can be queried repeatedly for the same data. The reading memory is cleared by a new `INITiate`, `MEASure:<function>?`, `READ?`, `*RST` or `SYSTem:PRESet`. No parameters.
`R?`	Reads and clears all readings from the reading memory. No parameters. Example response: `4||-4.98748741E-01,-4.35163427E-01,-4.33118686E-01,-3.48109378E-01`
`READ?`	Starts a new set of measurements and waits for all measurements to complete before transferring all available readings — equivalent to sending `INITiate;:FETCh?`. No parameters.
`TRIGger:COUNt {<count>|MIN|MAX|DEF|INFinity}` `TRIGger:COUNt? [{MIN|MAX|DEF}]`	Sets the number of triggers the instrument accepts; once the trigger count is reached, the instrument returns to Idle and stops triggering. Parameter: 1–1,000,000 or `INFinity`, default 1.
`TRIGger:SOURce {IMMediate|EXTernal|BUS}` `TRIGger:SOURce?`	`IMMediate`: trigger signal always present — fires immediately on entering Wait-for-Trigger. `BUS`: fires on `*TRG` sent over the remote interface while waiting. `EXTernal`: fires on a TTL pulse at the rear-panel Ext Trig input while waiting.
`TRIGger:DELay {<seconds>|MIN|MAX|DEF}` `TRIGger:DELay? [{MIN|MAX|DEF}]`	Sets the wait between the trigger signal and the start of measurement. If more than one measurement per trigger is configured (`SAMPle:COUNt>1`), the delay is inserted between each pair of adjacent measurements too. Setting an explicit delay disables auto delay (`TRIGger:DELay:AUTO OFF`).
`TRIGger:DELay:AUTO {ON|1|OFF|0}` `TRIGger:DELay:AUTO?`	Enables/disables automatic trigger delay. When on, the instrument computes the delay from the function, range and measurement time/bandwidth settings. Default: ON.
`SAMPle:COUNt {<count>|MIN|MAX|DEF}` `SAMPle:COUNt? [{MIN|MAX|DEF}]`	Sets the number of measurements (samples) taken per trigger. Can be combined with `TRIGger:COUNt`; total readings returned = sample count × trigger count.

Worked example (returns 5 DC-voltage readings, 2-second delay each): `CONF:VOLT:DC 10` / `SAMP:COUN 5` / `TRIG:DEL 2` / `READ?`

SUBSYSTEM 4 / 17

[SENSe:]VOLTage

Configures AC and DC voltage measurement at the sense-layer level (finer-grained than `CONFigure`).

Command	Description, parameters & example

`[SENSe:]VOLTage:AC:BANDwidth {<filter>|MIN|MAX}`
 	
`[SENSe:]VOLTage:AC:BANDwidth? [{MIN|MAX|DEF}]`
	Sets the AC filter cutoff frequency for AC voltage measurement. Three filters — slow (3 Hz), medium (20 Hz, default), fast (200 Hz) — trading low-frequency accuracy against AC settling time; specify the lowest frequency expected. Example: `VOLT:AC:BAND 200`

`[SENSe:]VOLTage:AC:SPEEd {<speed>}`
 	
`[SENSe:]VOLTage:AC:SPEEd?`
	Sets measurement speed, limited by the selected filter: 3 Hz filter supports SLOW only; 20 Hz supports SLOW/MEDium; 200 Hz supports SLOW/MEDium/FAST. Default: MEDium. Example: `VOLT:AC:SPEE SLOW`

`[SENSe:]VOLTage:AC:SECondary {OFF|BEForemath|FREQuency}`
 	
`[SENSe:]VOLTage:AC:SECondary?`
	Selects an auxiliary measurement function alongside AC voltage; read with `DATA2?`. Example: `VOLT:AC:SEC FREQ`

`[SENSe:]VOLTage:{AC|DC}:RANGe {<range>|MIN|MAX}`
 	
`[SENSe:]VOLTage:{AC|DC}:RANGe? [{MIN|MAX|DEF}]`
	Fixed range. AC: {100m|1|10|100|750}, default 10. DC: {100m|1|10|100|1000}, default 1000. Example: `VOLT:AC:RANG 10`

`[SENSe:]VOLTage:{AC|DC}:RANGe:AUTO {ON|OFF}`
 	
`[SENSe:]VOLTage:{AC|DC}:RANGe:AUTO?`
	Enables/disables autoranging. Autoranging down-ranges below 10% of range and up-ranges above 120% of range. Example: `VOLT:AC:RANG:AUTO ON`

`[SENSe:]VOLTage[:DC]:NPLC {<plc>|MIN|MAX}`
 	
`[SENSe:]VOLTage[:DC]:NPLC? [{MIN|MAX|DEF}]`
	Sets DC voltage measurement time in power-line cycles (PLC) — the number of A/D integration periods. Longer time gives higher resolution but lower speed. Choices: {0.02|0.2|1|10|100}. Example: `VOLT:NPLC 10`

`[SENSe:]VOLTage[:DC]:IMPedance:AUTO {ON|OFF}`
 	
`[SENSe:]VOLTage[:DC]:IMPedance:AUTO?`
	Enables/disables automatic input-impedance mode for DC voltage. Example: `VOLT:IMP:AUTO ON`

`[SENSe:]VOLTage[:DC]:ZERO:AUTO {ON|OFF}`
 	
`[SENSe:]VOLTage[:DC]:ZERO:AUTO?`
	Enables/disables DC auto-zero. ON: after each measurement the instrument measures its own internal offset and subtracts it from the previous reading, preventing input-circuit offset drift from affecting accuracy. OFF: uses the last-measured zero reading and subtracts it from every subsequent reading; a new zero reading is taken only when the function, range or measurement time changes. Example: `VOLT:ZERO:AUTO ON`

`[SENSe:]VOLTage[:DC]:SECondary {OFF|BEForemath}`
 	
`[SENSe:]VOLTage[:DC]:SECondary?`
	Selects an auxiliary measurement function alongside DC voltage; read with `DATA2?`. Example: `VOLT:DC:SEC BEF`

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[SENSe:]CURRent

Command	Description, parameters & example

`[SENSe:]CURRent:AC:BANDwidth {<filter>|MIN|MAX}`
 	
`[SENSe:]CURRent:AC:BANDwidth? [{MIN|MAX|DEF}]`
	AC filter cutoff for AC current — same slow(3 Hz)/medium(20 Hz, default)/fast(200 Hz) choice and trade-off as voltage. Example: `CURR:AC:BAND 200`

`[SENSe:]CURRent:AC:SPEEd {<speed>|MIN|MAX}`
 	
`[SENSe:]CURRent:AC:SPEEd? [{MIN|MAX|DEF}]`
	Measurement speed, limited by filter as for voltage (SLOW/MEDium/FAST availability). Default: MEDium. Example: `CURR:AC:SPEE SLOW`

`[SENSe:]CURRent:AC:SECondary {OFF|BEForemath|FREQuency}`
 	
`[SENSe:]CURRent:AC:SECondary?`
	Auxiliary measurement function for AC current; read with `DATA2?`. Example: `CURR:AC:SEC BEF`

`[SENSe:]CURRent:{AC|DC}:RANGe {<range>|MIN|MAX}`
 	
`[SENSe:]CURRent:{AC|DC}:RANGe? [{MIN|MAX|DEF}]`
	Fixed range for AC/DC current on the 3 A terminal. Range: {100u|1m|10m|100m|1|3}, default AUTO. The 10 A range cannot be selected with this command — use `[SENSe:]CURRent:{AC|DC}:TERMinals` (below). Example: `CURRent:AC:RANG 100m`

`[SENSe:]CURRent:{AC|DC}:RANGe:AUTO {ON|OFF}`
 	
`[SENSe:]CURRent:{AC|DC}:RANGe:AUTO?`
	Enables/disables autoranging (down-range below 10%, up-range above 120%). Example: `CURR:AC:RANG:AUTO ON`

`[SENSe:]CURRent:{AC|DC}:TERMinals {3|10}`
 	
`[SENSe:]CURRent:{AC|DC}:TERMinals?`
	Selects the physical current input terminal (and its associated range ceiling): 3 for the 3 A terminal, 10 for the 10 A terminal. Example: `CURR:AC:TERM 10`

`[SENSe:]CURRent[:DC]:NPLC {<plc>|MIN|MAX}`
 	
`[SENSe:]CURRent[:DC]:NPLC? [{MIN|MAX|DEF}]`
	DC current measurement time in power-line cycles. Choices: {0.02|0.2|1|10|100}. Example: `CURR:NPLC 1`

`[SENSe:]CURRent:DC:SECondary {OFF|BEForemath}`
 	
`[SENSe:]CURRent:DC:SECondary?`
	Auxiliary measurement function for DC current; read with `DATA2?`. Example: `CURR:DC:SEC BEF`

`[SENSe:]CURRent[:DC]:ZERO:AUTO {ON|OFF}`
 	
`[SENSe:]CURRent[:DC]:ZERO:AUTO?`
	Enables/disables DC auto-zero for current, same ON/OFF behaviour as voltage's auto-zero. Example: `CURR:ZERO:AUTO ON`

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[SENSe:]{RESistance|FRESistance} / {FREQuency|PERiod}

Resistance (2-wire / 4-wire)

Command	Description, parameters & example

`[SENSe:]{RESistance|FRESistance}:RANGe {<range>|MIN|MAX}`
 	
`...:RANGe? [{MIN|MAX|DEF}]`
	Fixed range, shared syntax for 2-wire and 4-wire. Range: {10|100|1k|10k|100k|1MA|10MA|100MA}. Example: `RES:RANG 10MA`

`...:RANGe:AUTO {ON|OFF}`
/
`...:RANGe:AUTO?`
	Autoranging (down-range below 10%, up-range above 120% of range). Example: `RES:RANG:AUTO ON`

`...:NPLC {<plc>|MIN|MAX}`
/
`...:NPLC? [{MIN|MAX|DEF}]`
	Measurement time in power-line cycles. Choices: {0.02|0.2|1|10|100}. Example: `RES:NPLC 1`

`...:SECondary {OFF|BEForemath}`
/
`...:SECondary?`
	Auxiliary measurement function (parameter shared between 2-wire and 4-wire); read with `DATA2?`. Example: `RES:SEC BEF`

`[SENSe:]RESistance:ZERO:AUTO {ON|OFF}`
 	
`[SENSe:]RESistance:ZERO:AUTO?`
	Auto-zero for 2-wire resistance (same ON/OFF behaviour as voltage auto-zero). No equivalent command is available for 4-wire resistance. Example: `RES:ZERO:AUTO ON`

Frequency / Period

The frequency/period counter works by first conditioning the input signal through the instrument's AC voltage front end; the commands below set the **voltage range** and **AC filter** that front end uses, not a frequency range or filter — the counted frequency/period value itself is not range-limited by these settings.

Command	Description, parameters & example

`[SENSe:]{FREQuency|PERiod}:VOLTage:RANGe {<range>|MIN|MAX}`
 	
`...:VOLTage:RANGe? [{MIN|MAX|DEF}]`
	Voltage input range used by the frequency/period counter's AC front end (not a frequency range), shared between frequency and period. Range: {100m|1|10|100|750}. Example: `FREQ:RANG 10`

`...:VOLTage:RANGe:AUTO {ON|OFF}`
/
`...:VOLTage:RANGe:AUTO?`
	Autoranging of the voltage input range above. Example: `FREQ:RANG:AUTO ON`

`...:RANGe:LOWer {<filter>|MIN|MAX}`
/
`...:RANGe:LOWer? [{MIN|MAX|DEF}]`
	Sets the AC bandwidth used to detect the signal during frequency/period measurement (shared parameter). Same slow(3 Hz)/medium(20 Hz, default)/fast(200 Hz) trade-off. Example: `FREQ:RANG:LOW 200`

`...:APERture {<seconds>|MIN|MAX}`
/
`...:APERture? [{MIN|MAX|DEF}]`
	Sets the aperture (gate) time for frequency/period measurement (shared). Choices: {10m|100m|1}. Larger aperture = higher accuracy, lower speed. Example: `FREQ:APER 100m`

`[SENSe:]FREQuency:SECondary {OFF|BEForemath|ACV|PERiod}`
 	
`[SENSe:]FREQuency:SECondary?`
	Auxiliary measurement for frequency; read with `DATA2?`. Example: `FREQ BEF`

`[SENSe:]PERiod:SECondary {OFF|BEForemath|ACV|FREQuency}`
 	
`[SENSe:]PERiod:SECondary?`
	Auxiliary measurement for period; read with `DATA2?`. Example: `PER BEF`

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[SENSe:]TEMPerture / [SENSe:]CAPacitance

Temperature

Command	Description, parameters & example

`[SENSe:]TEMPerture:NPLC {<plc>|MIN|MAX}`
 	
`[SENSe:]TEMPerture:NPLC? [{MIN|MAX|DEF}]`
	Measurement time in power-line cycles. Choices: {0.02|0.2|1|10|100}. Example: `TEMP:NPLC 10`

`[SENSe:]TEMPerture:TRANsducer:`
`{FRTD|RTD}:RESistance`
`{<reference>|MIN|MAX}`
 	
`...:RESistance? [{MIN|MAX|DEF}]`
	Sets the nominal resistance R_0 (resistance at 0 °C) for 2-wire and 4-wire RTD measurement. Example: `TEMP:TRAN:RTD:RES 10`

`[SENSe:]TEMPerture:TRANsducer:TYPE`
`{FRTD|RTD|FTHermistor|THERmistor}`
 	
`...:TYPE?`
	Selects the probe type for temperature measurement: 2-wire/4-wire RTD or 2-wire/4-wire thermistor. Example: `TEMP:TRAN:TYPE RTD`

`[SENSe:]TEMPerture:SECondary`
`{OFF|BEForemath|RESistor}`
 	
`[SENSe:]TEMPerture:SECondary?`
	Auxiliary measurement function; read with `DATA2?`. Example: `TEMP BEF`

`[SENSe:]TEMPerture:ZERO:AUTO {ON|OFF}`
 	
`[SENSe:]TEMPerture:ZERO:AUTO?`
	Auto-zero for temperature measurement, same ON/OFF behaviour as voltage. Example: `TEMP:ZERO:AUTO ON`

`UNIT:TEMPerture {C|F|K}`
 	
`UNIT:TEMPerture?`
	Sets the display/readback unit for temperature: Celsius, Fahrenheit or Kelvin. Example: `UNIT:TEMP F`

Capacitance

Command	Description, parameters & example

`[SENSe:]CAPacitance:RANGe`
`{<range>|MIN|MAX}`
 	
`[SENSe:]CAPacitance:RANGe?`
`[{MIN|MAX|DEF}]`
	Fixed range. Range: {1n|10n|100n|1u|10u|100u|1m|10m}. Example: `CAP:RANG 100n`

`[SENSe:]CAPacitance:RANGe:AUTO {ON|OFF}`
 	
`[SENSe:]CAPacitance:RANGe:AUTO?`
	Autoranging. Example: `CAP:RANG:AUTO ON`

`[SENSe:]CAPacitance:SECondary`
`{OFF|BEForemath}`
 	
`[SENSe:]CAPacitance:SECondary?`
	Auxiliary measurement function; read with `DATA2?`. Example: `CAP BEF`

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SYSTem — I/O Configuration

Command	Description, parameters & example

`SYSTem:COMMunicate:RS232:BAUDrate {4800|9600|19200|38400|57600|115200}`
 	
`...:BAUDrate?`
	Sets the RS-232 baud rate. Example: `SYST:COMM:RS232:BAUD 9600`

`SYSTem:COMMunicate:RS232:DATAbits {7|8}`
 	
`...:DATAbits?`
	Sets the RS-232 data bits. Example: `SYST:COMM:RS232:DATA 8`

`SYSTem:COMMunicate:RS232:PARity {EVEN|ODD|MARK|SPACE|NULL}`
 	
`...:PARity?`
	Sets the RS-232 parity mode. Example: `SYST:COMM:RS232:PAR NULL`

`SYSTem:COMMunicate:RS232:STOPbits {1|2}`
 	
`...:STOPbits?`
	Sets the RS-232 stop bits. Example: `SYST:COMM:RS232:STOP 1`

`SYSTem:COMMunicate:LAN:DNS{1|2} {<address>}`
 	
`...:DNS{1|2}?`
	Sets the primary/secondary DNS server address. Example: `SYST:COMM:LAN:DNS1 "192.168.1.4"`

`SYSTem:COMMunicate:LAN:GATeway {<address>}`
 	
`...:GATeway?`
	Sets the instrument's default gateway. Example: `SYST:COMM:LAN:GAT "192.168.1.5"`

`SYSTem:COMMunicate:LAN:HOSTname {<name>}`
 	
`...:HOSTname?`
	Sets the instrument's host name. Example: `SYST:COMM:LAN:HOST "LAB1-DMM"`

`SYSTem:COMMunicate:LAN:IPADdress "<address>"`
 	
`...:IPADdress?`
	Sets the static IP address. Example: `SYST:COMM:LAN:IPAD "192.168.1.242"`

`SYSTem:COMMunicate:LAN:PORT {<port>}`
 	
`...:PORT?`
	Sets the TCP port used for LAN communication. Default: 45454; user-configurable. Example: `SYST:COMM:LAN:PORT 45454`

`SYSTem:COMMunicate:LAN:SMASk {<smask>}`
 	
`...:SMASk?`
	Sets the subnet mask. Example: `SYST:COMM:LAN:SMAS 255.255.255.0`

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SYSTem — General Commands

Command	Description, parameters & example
`SYSTem:BEEPer[:IMMediate]`	Issues a single beep. No parameters. Example: `SYST:BEEP`
`SYSTem:BEEPer:STATe {ON|OFF}` `SYSTem:BEEPer:STATe?`	Enables/disables the beeper sounding during continuity, diode or probe-hold measurement, or when the front panel/remote interface generates an error. Example: `SYST:BEEP:STAT OFF`
`SYSTem:CLICk:STATe {ON|OFF}` `SYSTem:CLICk:STATe?`	Enables/disables the key-click beep when a front-panel key or soft key is pressed. Example: `SYST:CLIC:STAT OFF`
`SYSTem:DATE <year>,<month>,<day>` `SYSTem:DATE?`	Sets the real-time clock date (set the time separately with `SYSTem:TIME`). Uses a 32-bit Unix timestamp, max. year 2038. Parameters: year 1970–2038, month 1–12, day 1–(days in month). Example: `SYST:DATE 2018,5,29`
`SYSTem:TIME <hour>,<minute>,<second>` `SYSTem:TIME?`	Sets the real-time clock time. Parameters: hour 0–23, minute 0–59, second 0–59. Example: `SYST:TIME 13,59,10`
`SYSTem:VERSion?`	Queries the current firmware version. No parameters. Example: `SYST:VER?` → typical response `"1.10"`

DATA2 Subsystem (SUBSYSTEM 12 / 17)

Retrieves the auxiliary ("secondary") measurement result configured via the `...:SECondary` command of the active measurement function's subsystem (see §4–9 of this document).

Command	Description, parameters & example
`DATA2?`	No parameters. Example: `CONF:VOLT:DC 10` / `VOLT:DC:SEC BEF` / `READ?` → `1.70897747E-03` / `DATA2?` → `1.70897747E-03`

SUBSYSTEM 13 / 17

NULL

Sets and controls the instrument's Null (relative) operation. The `<function>` placeholder used in every command below takes one of the following values:

<function>	Meaning	<function>	Meaning
`VOLTage[:DC]`	DC voltage	`RESistance`	2-wire resistance
`VOLTage:AC`	AC voltage	`FRESistance`	4-wire resistance
`CURRent:DC`	DC current	`FREQuency`	Frequency
`CURRent:AC`	AC current	`Period`	Period
`TEMPerature`	Temperature	`CAPacitance`	Capacitance

Command	Description, parameters & example

`{<function>}:NULL:STATe {ON|OFF}`
 	
`{<function>}:NULL:STATe?`
	Enables/disables the Null function for the specified function. Example: `VOLT:DC:NULL:STAT ON`

`{<function>}:NULL:VALue {<value>}`
 	
`{<function>}:NULL:VALue?`
	Sets a null value for the specified function. Requires Null state to be ON. Setting a specific null value disables automatic null-value selection (`...:NULL:VALue:AUTO OFF`). Example: `VOLT:DC:NULL:VAL 0.214`

`{<function>}:NULL:VALue:AUTO {ON|OFF}`
 	
`{<function>}:NULL:VALue:AUTO?`
	Enables/disables automatic null-reference selection. When on, the first measurement taken is used as the null value for all subsequent measurements, and the explicit `...:NULL:VALue` is updated to match; manual null-value selection is then disabled. Example: `VOLT:DC:NULL:VALue:AUTO ON`

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CALCulate:SCALe

Sets and controls the instrument's math (scaling) operations: dB, dBm, Percent and mX+b.

Command	Description, parameters & example

`CALCulate:SCALe:DB:REFerence {<reference>}`
 	
`CALCulate:SCALe:DB:REFerence?`
	Stores the reference value in the meter's dB relative register, used by the `CALCulate:SCALe:FUNCtion` dB function: once dB is enabled, the stored value is subtracted from each voltage reading after conversion to dBm. Example: `CALC:SCAL:DB:REF -10.0`

`CALCulate:SCALe:DBM:REFerence {<reference>}`
 	
`CALCulate:SCALe:DBM:REFerence?`
	Selects the reference resistance used to convert a voltage reading to dBm; this value affects both the dBm and dB scaling functions. Example: `CALC:SCAL:DBM:REF 300`

`CALCulate:SCALe:FUNCtion {DB|DBM|PCT|SCALe}`
 	
`CALCulate:SCALe:FUNCtion?`
	`DB`: relative dB — result is the difference, in dBm, between the input signal and the stored dB reference (both converted to dBm); dB is valid for ACV/DCV only. `DBM`: dBm = $10\times\log_{10}$(reading²/ref.resistance/1 mW); valid for ACV/DCV only. `PCT`: percent-change = ((reading−reference)/reference)×100. `SCALe`: mX+b = reading×gain(M) + offset(B); valid for all functions except ratio, continuity and diode. Example: `CALC:SCAL:FUNC DB` / `CALC:SCAL:STAT ON`

`CALCulate:SCALe:GAIN {<gain>}`
 	
`CALCulate:SCALe:GAIN?`
	Sets the gain (M) used by the mX+b scaling function. Example: `CALC:SCAL:GAIN 100`

`CALCulate:SCALe:OFFSet {<offset>}`
 	
`CALCulate:SCALe:OFFSet?`
	Sets the offset (B) used by the mX+b scaling function. Example: `CALC:SCAL:OFFSet 5`

`CALCulate:SCALe:REFerence {<reference>}`
 	
`CALCulate:SCALe:REFerence?`
	Sets the reference value used by the Percent scaling function. Example: `CALC:SCAL:REF 100`

`CALCulate:SCALe:REFerence:AUTO {ON|OFF}`
 	
`CALCulate:SCALe:REFerence:AUTO?`
	Enables/disables automatic reference selection for the dB function. Example: `CALC:SCAL:REF:AUTO ON`

`CALCulate:SCALe[:STATe] {ON|OFF}`
 	
`CALCulate:SCALe[:STATe]?`
	Enables/disables the scaling function. Example: `CALC:SCAL:STAT ON`

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CALCulate:LIMit / CALCulate:AVERage

CALCulate:LIMit — limit (pass/fail) test

Command	Description, parameters & example
`CALCulate:LIMit:LOWer[:DATA] {<value>}` `CALCulate:LIMit:LOWer[:DATA]?`	Sets the lower limit for the limit test. Example: `CALC:LIM:LOW -50`
`CALCulate:LIMit:UPPer[:DATA] {<value>}` `CALCulate:LIMit:UPPer[:DATA]?`	Sets the upper limit for the limit test. Example: `CALC:LIM:UPP 50`
`CALCulate:LIMit[:STATe] {ON|OFF}` `CALCulate:LIMit[:STATe]?`	Enables/disables the limit test. Example: `CALC:LIM ON`
`CALCulate:LIMit:CLEar[:IMMediate]`	Clears the limit-test result. No parameters. Example: `CALC:LIM:CLE`

CALCulate:AVERage — statistics

Computes running statistics on measured readings.

Command	Description
`CALCulate:AVERage:ALL?`	Returns the arithmetic mean (average), standard deviation, minimum and maximum of all measurements taken since the statistics were last cleared. Does **not** return the count or peak-to-peak value.
`CALCulate:AVERage:AVERage?`	Returns the average value only.
`CALCulate:AVERage:COUNt?`	Returns the reading count only.
`CALCulate:AVERage:MAXimum?`	Returns the maximum value only.
`CALCulate:AVERage:MINimum?`	Returns the minimum value only.
`CALCulate:AVERage:PTPeak?`	Returns the peak-to-peak value only.
`CALCulate:AVERage:SDEViation?`	Returns the standard deviation only.
`CALCulate:AVERage[:STATe] {ON|OFF}` `CALCulate:AVERage[:STATe]?`	Enables/disables statistics calculation. Example: `CALC:AVER ON`
`CALCulate:AVERage:CLEar[:IMMediate]`	Clears all computed statistics: min, max, average, peak-to-peak, count and standard deviation. No parameters. Example: `CALC:AVER:CLE`

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Other Commands

Command	Description, parameters & example
`HANDshake {ON|OFF}`	Sets the handshake-signal state. When on, the instrument echoes the original command back before processing any command it receives. Example: `HANDshake on`
`RETurn {ON|OFF}`	Sets automatic data return. When on, the instrument automatically sends the measurement result to the active communication port after every measurement completes. Example: `RETurn on`
`REAR`	Switches the active measurement terminal to the rear panel (TH1963 only). No parameters. Example: `REAR`
`FRONt`	Switches the active measurement terminal to the front panel. No parameters. Example: `FRONt`

Worked example program

DC voltage and 2-wire resistance test routine:

```
*IDN?  //returns the instrument model, confirming the link is working
CONF:VOLT:DC  //switches to DC voltage mode
VOLT:DC:RANG 10  //switches to the 10 V range
VOLT:DC:NPLC 1  //switches to 1 PLC
READ?  //measures and returns a reading
READ?  //measures and returns a reading
READ?  //measures and returns a reading
CONF:RES  //switches to 2-wire resistance mode
RES:RANG 10k  //switches to the 10 kΩ range
RES:NPLC 10  //switches to 10 PLC
READ?  //measures and returns a reading
READ?  //measures and returns a reading
READ?  //measures and returns a reading
```

> **NOTE**
> Send a newline after each individual command, or command parsing errors may result.

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