TECHMIZE by TONGHUI

CR

SCPI COMMAND REFERENCE

TH2836 Series

Remote Command Set — TH2836 / TH2836A

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INTRODUCTION

Conventions & Interfaces

This reference documents the TH2836 series' SCPI-style command set in full.

1 Remote interfaces

Interface	Notes
RS-232C	Standard on all models; baud rate 9.600k–115.200k, set on <System Settings>.
USB Device (USBTMC / USBCDC)	Standard on all models.
LAN	Standard; configured on <Network Settings> (DHCP, IP, subnet, gateway, TCP/IP port).
GPIB (IEEE-488)	Optional — requires the GPIB interface board to be fitted.

Select the active bus with Bus Mode (<System Settings>). **Talk Only** mode streams every result over the active bus without addressing, and disables PC control while active.

2 Notation

- **NR1** = integer (e.g. `123`); **NR2** = fixed-point (e.g. `12.3`); **NR3** = floating-point (e.g. `12.3E+5`).
- **NL** = newline (ASCII 10); **^END** = the IEEE-488 EOI signal.
- Commands are shown with the shortest legal abbreviation in capitals (e.g. `DISPlay` can be sent as `DISP`); a query form appends `?`.
- <n> in a command name is a numeric suffix selecting an instance — e.g. `LIST:BAND<n>` addresses list-sweep point n (1–10), `FUNCtion:DEV<n>` addresses parameter 1 (primary) or 2 (secondary).

3 Subsystem index

Subsystem	Covers
DISPlay	Active display page, measurement label, result font
Signal Source (FREQuency / VOLTage / CURRent / AMPLitude / OUTPut)	AC test signal frequency, level, ALC, bias-current isolation
BIAS	Internal DC bias voltage/current/polarity
FUNCtion	Measured parameter pair, range, monitors, deviation test, step delay, DCR range
LIST	List-sweep configuration — up to 10 points × up to 8 channels
APERture / TRIGger	Measurement speed/averaging, trigger source and delay
FETCh?	Reading back the last measurement result
CORRection	Open/short/load correction, cable length, 201-point calibration table
COMParator	Bin comparator, limits, bin counting
Mass MEMory	Saving/loading *.STA setup files
Common commands	IEEE-488.2 *RST, *IDN?, *TRG, status registers, etc.

SUBSYSTEM

DISPlay

Sets the instrument's active display page, the current measurement label, and the result-font size.

Command	Parameters / range	Description & example
`DISPlay:PAGE <page>` `DISPlay:PAGE?`	`MEASurement · BNUMber · BCOunt · LIST · MSETup · CSETup · LTABle · LSETup · LCORR · LDISP · SYSTem · FLISt · HDLS · CHSE`	Sets/queries the active display page. `DISP:PAGE MEAS` → component measurement display.
`DISPlay:LINE "<string>"` `DISPlay:LINE?`	`ASCII string, up to 16 characters`	Sets/queries the current measurement label (usable as a save file name). `DISP:LINE "Resistor meas"`
`DISPlay:RFONt <font>` `DISPlay:RFONt?`	`LARGe (≈12 ms/reading) · TINY (≈5 ms/reading) · OFF (not shown, still readable over the bus)`	Sets/queries the measurement-result font size. `DISP:RFON LARG`

SUBSYSTEM

Signal Source — FREQuency, VOLTage, CURRent, AMPLitude, OUTPut

Sets the AC test signal directly; each behaves the same way as the matching field on <Measurement Display>.

Command	Parameters / range	Description & example
`FREQuency <value>|MIN|MAX` `FREQuency?`	NR1/NR2/NR3 + Hz/kHz/MHz. MIN = 4 Hz. MAX = 8.5 MHz (TH2836) / 5 MHz (TH2836A). Query returns NR3.	Sets/queries the test frequency. `FREQ 1KHZ`
`VOLTage <value>|MIN|MAX` `VOLTage?`	NR1/NR2/NR3 + V. MIN = 5 mV. MAX = 2 V.	Sets/queries the AC test level as a voltage. `VOLT 1V`
`CURRent <value>|MIN|MAX` `CURRent?`	NR1/NR2/NR3 + A/mA/µA. MIN = 50 µA. MAX = 20 mA.	Sets/queries the AC test level as a current. `CURR 1MA`
`AMPLitude:ALC ON|OFF|1|0` `AMPLitude:ALC?`	1 = ON, 0 = OFF	Sets/queries Auto Level Control (constant level). `AMPL:ALC 0`
`OUTPut:DC:ISOLation ON|OFF|1|0` `OUTPut:DC:ISOLation?`	1 = ON, 0 = OFF	Sets/queries the DC bias-current isolation function (§5.1.8 of the Operation Manual). `OUTP:DC:ISOL 0`

SUBSYSTEM

BIAS

Sets the instrument's internal DC bias source.

Command	Parameters / range	Description & example
`BIAS:STATe ON|OFF|1|0` `BIAS:STATe?`	`1 = ON, 0 = OFF`	Enables/disables DC bias output. `BIAS:STAT 0`
`BIAS:VOLTage <value>|MIN|MAX` `BIAS:VOLTage?`	`NR1/NR2/NR3. MIN = −10 V. MAX = +10 V.`	Sets/queries the internal bias voltage. `BIAS:VOLT 1V`
`BIAS:CURRent <value>|MIN|MAX` `BIAS:CURRent?`	`NR1/NR2/NR3. MIN = −100 mA. MAX = +100 mA.`	Sets/queries the internal bias current. `BIAS:CURR MIN`
`BIAS:POLarity:AUTO ON|OFF|1|0`	`1 = AUTO, 0 = FIX`	Sets automatic varactor-diode bias-polarity control (§5.1.6 of the Operation Manual). `BIAS:POL:AUTO 1`

> **NOTE**
> Built-in bias is ±10 V / ±100 mA. For higher current, connect external TH1779A bias-current sources (up to eight units, 400 A total) and select the external bias source on <System Settings> (Operation Manual §6.1).

SUBSYSTEM

FUNCtion

Sets the measured parameter pair, range, source monitors, deviation-test mode and step delay.

Function enum <fn> (used throughout this reference)

Value	Parameter	Value	Parameter
CPD	Cp-D	LPRD	Lp-Rd
CPQ	Cp-Q	LPZ	Lp-Z
CPG	Cp-G	LSD	Ls-D
CPRP	Cp-Rp	LSQ	Ls-Q
CSD	Cs-D	LSRS	Ls-Rs
CSQ	Cs-Q	LSRD	Ls-Rd
CSRS	Cs-Rs	LSZ	Ls-Z
LPQ	Lp-Q	RX	R-X
LPD	Lp-D	RSQ	Rs-Q
LPG	Lp-G	RPQ	Rp-Q
LPRP	Lp-Rp	ZTD / ZTR	Z-θ° / Z-θr
GB	G-B	YTD / YTR	Y-θ° / Y-θr
DCR	DCR		

Not every value is accepted by every command — `CORRection:LOAD:TYPE` omits LPRD, LSRD, LSZ, LPZ, RPQ, RSQ; see the command's own row if in doubt.

Command	Parameters / range	Description & example
`FUNCtion:IMPedance <fn>` **`FUNCtion:IMPedance?`**	`See function enum above`	Sets/queries the measured parameter pair. `FUNC:IMP RX`
`FUNCtion:IMPedance:RANGe <value>` **`FUNCtion:IMPedance:RANGe?`**	`NR1/NR2/NR3 + OHM/KOHM. Values: 0.1, 1, 10, 20, 50, 100, 200, 500, 1k, 2k, 5k, 10k, 20k, 50k, 100k Ω`	Sets/queries the AC test range. `FUNC:IMP:RANG 1KOHM`
`FUNCtion:IMPedance:RANGe:AUTO ON|OFF|1|0` **`...:AUTO?`**	`1 = ON (auto), 0 = OFF (hold)`	Sets/queries AC auto-ranging. `FUNC:IMP:RANG:AUTO ON`
`FUNCtion:DCResistance:RANGe <value>` **`...:RANGe?`**	`13-step range, DCR-specific: 10, 20, 50, 100, 200, 500, 1k, 2k, 5k, 10k, 20k, 50k, 100k Ω`	Sets/queries the DCR range. `FUNC:DCR:RANG 1KOHM`
`FUNCtion:DCResistance:RANGe:AUTO ON|OFF|1|0` **`...:AUTO?`**	`1 = ON, 0 = OFF`	Sets/queries DCR auto-ranging. `FUNC:DCR:RANG:AUTO ON`
`FUNCtion:SMONitor:VDC ON|OFF|1|0` **`...:VDC?`**	`1 = ON, 0 = OFF`	DC-bias voltage-monitor switch. `FUNC:SMON:VDC ON`
`FUNCtion:SMONitor:IDC ON|OFF|1|0` **`...:IDC?`**	`1 = ON, 0 = OFF`	DC-bias current-monitor switch. `FUNC:SMON:IDC ON`
`FUNCtion:DEV<n>:MODE ABSolute|PERCent|OFF` **`...:MODE?`**	`n = 1 (primary) or 2 (secondary)`	Sets/queries deviation-test display mode. `FUNC:DEV1:MODE ABS`
`FUNCtion:DEV<n>:REFerence <value>` **`...:REFerence?`**	`NR1/NR2/NR3`	Sets/queries the deviation reference (nominal) value. `FUNC:DEV1:REF 10`

FUNCtion:DEV<n>:REFerence:FILL	—	Triggers one measurement and copies the result into the DEV<n> reference. `FUNC:DEV1:REF:FILL`
FUNCtion:StepDELay <value>|MIN|MAX **FUNC:SDEL?**	NR1/NR2/NR3, 0–60 s, 1 ms resolution. MIN = 0 s. MAX = 60 s.	Sets/queries the step-delay time. `FUNC:SDEL 5S`

SUBSYSTEM

LIST

Configures list-sweep measurement: scan-point count and mode, per-point test conditions, per-point limits, and per-point display settings. Up to **10** scan points (`<n> = 1–10`), each with the full parameter set, addressed as `LIST:BAND<n>:...`

Global list settings

Command	Parameters / range	Description & example
`LIST:MODE SEQuence|STEPped` `LIST:MODE?`	`SEQuence = sweep all points per trigger. STEPped = one point per trigger.`	`LIST:MODE SEQ`
`LIST:TOTAL <value>` `LIST:TOTAL?`	`NR1, 1–10`	Total number of scan points. `LIST:TOTAL 10`
`LIST:CH:MODE SINGle|MULTi` `LIST:CH:MODE?`	`SINGle or MULTi (up to 8 channels)`	List-sweep channel mode. `LIST:CH:MODE MULT`
`LIST:LENGth 0m|1m|2m` `LIST:LENGth?`	`0 m, 1 m, 2 m`	Cable length used for list-sweep correction. `LIST:LENGth 1m`
`LIST:RESTart`	—	Restarts the sweep from point 1.
`LIST:CLEar:ALL`	—	Clears the setup data for all scan points.

Per-point settings — LIST:BAND<n>:...

Each row below is a family of commands of the form `LIST:BAND<n>:<suffix> <value>`, with a matching ? query form, for point `<n> = 1–10`.

Suffix	Parameters / range	Description
`:CH <value>`	`NR1, channel number (multi-channel mode)`	Scanning channel for this point.
`:BIAS:VOLTage /` `:CURRent <value>`	`Same range as BIAS:VOLTage / BIAS:CURRent`	DC bias for this point.
`:FREQuency <value>`	`4 Hz – 8.5 MHz (TH2836)`	Test frequency for this point.
`:LEVel:AC:VOLTage /` `:CURRent <value>`	`Same range as VOLTage / CURRent`	AC test level for this point.
`:LEVel:DC:VOLTage` `<value>`	`100 mV – 2 V`	DC test level (DCR-type functions).
`:FUNC <fn>`	`Function enum (previous page)`	Measured parameter pair for this point.
`:LIMit:MODE` `ABSolute|PERCent`	—	Limit basis for this point.
`:LIMit:A:LOW / :HIGH` `<value>`	`NR1/NR2/NR3`	Primary-parameter limits for this point.
`:LIMit:B:LOW / :HIGH` `<value>`	`NR1/NR2/NR3`	Secondary-parameter limits for this point.
`:SPEED` `FAST|MEDium|SLOW`	—	Measurement speed for this point.
`:AVERAGe <value>`	`NR1, 1–255`	Average count for this point.
`:ALC ON|OFF`	`1/0`	Auto Level Control for this point.
`:POL AUTO|FIX`	—	Bias polarity for this point.

`:RANGe:AC / :DC / :DCI AUTO|HOLD|<value>`	`Same range lists as FUNCtion:IMPedance:RANGe`	AC / DC / DCI range for this point.
`:ISO ON|OFF`	`1/0`	Bias-current isolation for this point.
`:CORRection:OPEN / :SHORt / :LOAD`	—	Runs open / short / load correction for this point.
`:CORRection:OPEN:STATe / :SHORt:STATe / :LOAD:STATe ON|OFF`	`1/0`	Enables/disables each correction type for this point.
`:CORRection:LOAD:REFerence:A / :B <value>`	`NR1/NR2/NR3`	Load-correction standard reference for this point.
`:STD <value>|STEP1`	`NR1/NR2/NR3, or STEP1 (use point 1's result as nominal)`	Nominal (sorting reference) value for this point.
`:DELay <value>|MIN|MAX`	`0–60 s, MIN=0s, MAX=60s`	Step delay for this point (e.g. to let an external TH1779A bias source settle).

Example: `LIST:BAND2:RANGe:AC AUTO` sets point 2's AC range to automatic; `LIST:BAND3:STD 1` sets point 3's nominal to 1 (unit follows the active function); `LIST:BAND1:LIMit:A:LOW 325E-9` sets point 1's primary lower limit.

List display settings — LIST:DISPlay:<item>

Command	Parameters / range	Description & example
`LIST:DISPlay:<item> <value>|ON|OFF` `LIST:DISPlay:<item>?`	`<item>: FREQ, ACLV, BIAS, FUNC, MAIN, MPER, COMP, DCLV, ACRNG, CH, ALOW, AHIGH, BLOW, BHIGH, SPEED, SUB, STD, DELAY, AVG, DCIRNG, DCRNG. <value> (NR1) sets that column's display order.`	Toggles a column on/off, or sets its display order, on <List Sweep Display>. Query returns `<order>,ON/OFF`. `LIST:DISPlay:MAIN ON` — show the primary-parameter column. `LIST:DISPlay:MAIN 3` — set its display order to column 3.

SUBSYSTEM

APERture & TRIGger

Command	Parameters / range	Description & example
APERture FAST|MEDium|SLOW[, <avg>] APERture?	FAST ≈130/s · MEDium ≈11/s · SLOW ≈4/s. <avg> = NR1, 1–255.	Sets/queries measurement speed and average count together. APER MED,55
TRIGger[:IMMediate]	—	Fires one triggered measurement.
TRIGger:SOURce INTernal|EXTernal|BUS|HOLD TRIGger:SOURce?	INTernal = free-run (default). EXTernal = HANDLER interface. BUS = triggered by command over RS-232C/GPIB/USB/LAN. HOLD = front-panel [TRIGGER] key.	TRIG:SOUR BUS
TRIGger:DELay <value>|MIN|MAX TRIGger:DELay?	0–60 s, 1 ms resolution. MIN = 0 s. MAX = 60 s.	TRIG:DEL 5S

SUBSYSTEM

FETCh?

Reads the last measurement result from the output buffer. Typical sequence: `TRIG:SOUR BUS` → `TRIG` → `FETC?`. All data returns as ASCII.

Command	Parameters / range	Description
`FETCh[:IMP]?`	–	Returns the last measurement. Format below.
`FETCh:SMONitor:VAC?` `FETCh:SMONitor:IAC?`	–	Returns the voltage / current monitor reading.

On <Measurement Display>, <Bin No. Display> and <Bin Count Display>, the return format is:

`<DATA A>,<DATA B>,<Status>,<Bin><NL^END>`

On <List Sweep Display>, once per scan point:

`<DATA A>,<DATA B>,<Status>,<Judge><NL^END>`

Field	Values
DATA A / DATA B	12-digit ASCII (SN . NNNNNESNN): primary / secondary reading. Reads `+9.99999E+37` when Status is −1, +1 or +2.
Status	2-digit ASCII. −1 no data in buffer · 0 normal measurement · +1 analog bridge unbalance · +2 A/D conversion fault · +3 signal source overload · +4 constant-level cannot be adjusted.
Bin	2–3 digit ASCII. 0 = out of tolerance · +1…+9 = Bin1–Bin9 · +10 = auxiliary bin. Populated only when the comparator is ON.
Judge (list sweep)	2-digit ASCII. −1 low · 0 pass · +1 high. Always 0 when the list-scan compare function is off.

SUBSYSTEM

CORRection

Programs open/short/load correction. SPOT<n> commands (n = 1–10 in this instrument's addressing) reach the point-frequency correction table (up to 201 stored points overall); the plain OPEN/SHORt commands run the interpolated full-frequency correction across all 65 (TH2836) / 58 (TH2836A) fixed calibration points at once.

Command	Parameters / range	Description & example
CORRection:LENGth <value> CORRection:LENGth?	0, 1, 2 or 4 + M suffix	Sets/queries the calibration cable length. CORR:LENG 1M
CORRection:OPEN	—	Runs full-frequency open-circuit correction (fixture open, ~30 s).
CORRection:OPEN:STATe ON|OFF|1|0 ...:STATe?	1/0	Enables/disables open correction. CORR:OPEN:STAT ON
CORRection:SHORt	—	Runs full-frequency short-circuit correction (shorting plate fitted, ~30 s).
CORRection:SHORt:STATe ON|OFF|1|0 ...:STATe?	1/0	Enables/disables short correction.
CORRection:LOAD:STATe ON|OFF|1|0 ...:STATe?	1/0	Enables/disables load correction.
CORRection:LOAD:TYPE <fn> ...:TYPE?	Function enum (CPD, CPQ, CPG, CPRP, CSD, CSQ, CSRS, LPQ, LPD, LPG, LPRP, LSD, LSQ, LSRS, RX, ZTD, ZTR, GB, YTD, YTR)	Sets/queries the parameter pair used for load correction. CORR:LOAD:TYPE CPD
CORRection:SPOT<n>:STATe ON|OFF|1|0 ...:STATe?	n = 1–10 at a time addressable; up to 201 points overall	Enables/disables a specific calibration point. CORR:SPOT1:STAT ON
CORRection:SPOT<n>:FREQuency <value> ...:FREQuency?	4 Hz – 8.5 MHz (TH2836)	Sets/queries a calibration point's frequency. CORR:SPOT1:FREQ 2kHZ
CORRection:SPOT<n>:OPEN CORRection:SPOT<n>:SHORt	—	Runs open / short correction at that specific point. CORR:SPOT1:OPEN
CORRection:SPOT<n>:LOAD:STANdard <REF.A>,<REF.B> ...:STANdard?	NR1/NR2/NR3 each	Sets/queries the standard reference for load correction at that point. CORR:SPOT1:LOAD:STAN 0.0017,2
CORRection:USE:DATA?	—	Returns all 201 points' open/short/load data as repeating groups of 6 NR3 values (open A, open B, short A, short B, load A, load B) per point.
CORRection:CLEar	—	Clears calibration data for all points.

SUBSYSTEM

COMParator

Programs the bin comparator and <Limit Table Settings>.

Command	Parameters / range	Description & example
`COMParator[:STATe] ON|OFF|1|0` `COMParator[:STATe]?`	`1/0`	Comparator on/off. `COMP ON`
`COMParator:MODE ATOLerance|PTOLerance|SEQuence` `COMParator:MODE?`	`ATOLerance = absolute tolerance · PTOLerance = percent tolerance · SEQuence = sequential/raw-value`	`COMP:MODE ATOL`
`COMParator:TOLerance:NOMinal <value>` `...:NOMinal?`	`NR1/NR2/NR3 (valid only in tolerance mode)`	Nominal value for tolerance-mode limits. `COMP:TOL:NOM 100E-12`
`COMParator:TOLerance:BIN<n> <lo>,<hi>` `...:BIN<n>?`	`n = 1–9. lo/hi = NR1/NR2/NR3, lo < hi`	Bin<n> limits in tolerance mode. `COMP:TOL:BIN1 -5,5`
`COMParator:SEQuence:BIN <B1lo>,<B1hi>,<B2hi>,…,<B9hi>` `...:BIN?`	`Cascading list, each bin's high limit becomes the next bin's low limit`	Sets all bin limits at once in sequential mode. `COMP:SEQ:BIN 10,20,30,40,50`
`COMParator:SLIMit <lo>,<hi>` `COMParator:SLIMit?`	`NR1/NR2/NR3, lo < hi`	Secondary-parameter limit pair. `COMP:SLIM 0.001,0.002`
`COMParator:Auxiliary BIN ON|OFF|1|0` `...BIN?`	`1/0`	Auxiliary (subsidiary) bin on/off. `COMP:ABIN ON`
`COMParator:SWAP ON|OFF|1|0` `COMParator:SWAP?`	`1/0`	Swaps which parameter (primary/secondary) is sorted on the 9-bin table. `COMP:SWAP ON`
`COMParator:BIN:CLEar`	—	Clears every limit on <Limit Table Settings>.
`COMParator:BIN:COUNt[:STATe] ON|OFF|1|0` `...[:STATe]?`	`1/0`	Bin-count accumulation on/off. `COMP:BIN:COUN ON`
`COMParator:BIN:COUNt:DATA?`	—	Returns <BIN1>,...,<BIN9>,<OUT>,<AUX> counts, all NR1.
`COMParator:BIN:COUNt:CLEar`	—	Zeroes all bin counts.

SUBSYSTEM

Mass MEMory

Saves and loads complete instrument setups (*.STA files, §6.5 of the Operation Manual).

Command	Parameters / range	Description & example
`MMEMory:LOAD:STATe <value>`	`NR1, file number 0–39`	Loads a saved setup file. `MMEM:LOAD:STAT 1`
`MMEMory:STORe:STATe <value>[,"<name>"]`	`NR1 (0–39); name = ASCII string, up to 16 characters`	Saves the current setup to a file, with an optional name (default name used if omitted). `MMEM:STOR:STAT 1,"Resistor meas"`

REFERENCE

IEEE-488.2 Common Commands

Command	Description
`*RST`	Resets the instrument to its power-on state.
`*TRG`	Triggers a measurement and sends the result to the output buffer.
`*CLS`	Clears the standard event status register and service request status register.
`*IDN?`	Returns `<manufacturer>,<model>,<firmware>,<HW_version>` — e.g. `Tonghui,TH2836,VER1.0.0,HardWare Ver A5.0`.
`*TST?`	Runs the internal self-test; returns 0 if no error.
`*OPC / *OPC?`	`*OPC` sets the OPC bit once all pending operations complete; `*OPC?` returns ASCII "1" at that point.
`*ESE <value> / *ESE?`	Sets/reads the Standard Event Status *Enable* register (NR1, bit-weighted — see table below).
`*ESR?`	Reads and clears the Standard Event Status register (same bit layout as below).
`*SRE <value> / *SRE?`	Sets/reads the Service Request Enable register (NR1, bit-weighted — see table below).
`*STB?`	Reads the Status Byte register without clearing it (same bit layout as below).

Standard Event Status register bits (*ESE / *ESR?)

Bit	Meaning
7	Power On (PON)
6	User Request (URQ)
5	Command Error (CME)
4	Execution Error (EXE)
3	Device-Dependent Error (DDE)
2	Query Error (QYE)
1	Request Control (RQC)
0	Operation Complete (OPC)

Status Byte register bits (*SRE / *STB?)

Bit	Meaning
7	Operation Status Register summary
6	RQS — Request Service
5	Standard Event Status Register summary
4	MAV — Message Available
3–0	Always 0

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