meatest

M600 Resistance Decade Boxes

remote control manual

Content

1. Connection Setup

The calibrator can be integrated into automated calibration systems (ATS) and generally controlled from remote computer via RS232, GPIB (IEEE488), LAN and USB interface. When controlled remotely, maximum ratings of calibrator's output signals as well as all other specifications are the same as in manual mode.

Only one interface can be used for communication at any given time. To establish connection between the calibrator and computer, select preferred interface in MENU (RS232 is active by default) and follow instructions from relevant subchapter below.

1.1. RS232 and USB Connection

Connect the calibrator to your remote controller (PC) using either:
- 9-pin D-SUB, 1:1 male/female RS232 cable, or
- USB 2.0 A-B cable

And set the remote controller as follows:
- COM port   see available COM ports in Windows Device Manager
                       USB appears as serial converter "USB Serial Port (COMxx)"
- Baudrate   9600 (can be changed to 1200 – 115200 in calibrator Menu->Interface)
- Data bits   8
- Stop bits   1
- Parity   None
- Handshake (Xon/Xoff) Off

1.2. GPIB Connection

Set GPIB address of controlled device in your remote controller (PC) to match value in calibrator's MENU->Interface->GPIB Address (2 by default).

Connect the calibrator to your remote controller (PC) using IEEE488 cable. When using converters, make sure you use National Instruments converters as other types (e.g. Agilent) might not work properly. Once connected, the calibrator automatically executes IEEE488 bus commands SH1, AH1, T5, L3, RL1, and DC1 (in that order). Calibrator also recognizes following general commands:

- DCL   Device Clear – resets device to its basic state
- SDC   Selected Device Clear – resets device to its basic state
- LLO   Local Lock Out – puts device into Remote mode and locks keyboard
- GTL   Go To Local – returns device from Remote mode and unlocks keyboard

1.3. Ethernet Connection

Ethernet connection uses IPv4 Telnet, TCP or UDP protocols to communicate with remote controller (PC). By default, calibrator is set to establish Telnet/TCP/UDP server with DHCP hostname "M630_SNxxxxxx" ("xxxxxx" stands for serial number), listening to port 23 for the Telnet protocol and 22 for the TCP and UDP protocols.. All IPv4 parameters can be changed in calibrator Menu > Interface > LAN Settings:

- DHCP discovery ON/OFF
- Port number (settable separately for Telnet, TCP and UDP)
- Host name (with DHCP ON)
- IP address, subnet mask and default gateway (with DHCP OFF; in this case use IP address instead of hostname from now on)

Connect remote controller (PC) using at least category 4 UTP cable. It is recommended to check LAN connection with ping utility afterwards (type "ping " and hostname into Windows command line and see if the calibrator responds).

Once connected, you'll be able to log into the calibrator as Telnet client using Microsoft Telnet Client, Putty or similar. To start MS Telnet Client, open your command line and type in „Telnet". Then proceed with „o M63x/M64x_SNxxxxxx yy", where "xxxxxx" is serial number and "yy" is communication port.

Connection to simulator box using Microsoft Telnet terminal with DHCP option enabled:
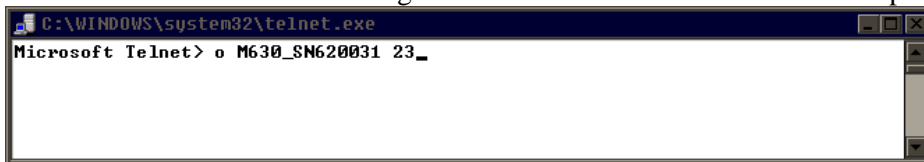
If connection is successful following screen will appear:

2. Executing Commands

Most commands can be executed in Remote mode only. In Remote mode, device blocks manual entry interfaces (keyboard, touchscreen) to prevent unintended manipulation during remote control session. GPIB interface switches device into and out of Remote mode automatically. Other interfaces (RS232) need to use following commands:

- SYSTem:REMote   Puts device into Remote mode
- SYSTem:LOCal   Returns device from Remote mode and unlocks keyboard
- SYSTem:RWLock   Put device into Remote mode and locks all keys (including Local key).

2.1. Command Syntax

All commands listed in this chapter are made of KEYWORDS and PARAMETERS.

One or more KEYWORDS divided by colons (:) make up name of a command. When typing a command, keywords in square brackets ([ ]) can be omitted as well as lowercase letters and leading colons. For example ":OUTPut:STATe ON", ":OUTPut ON" and "OUTP 1" are considered the same.

Different PARAMETER types describe what kind of data is expected. For more details on parameter types, see table below. In command reference parameters are indicated by sharp brackets (< >) and separated by commas (,). Square brackets ([ ]) indicate non-mandatory parameters, vertical lines (|) indicate parameter alternatives.

Multiple commands can be executed at once if separated by semicolon (;). In any case, command (or set of commands) has to end with line feed (LF) terminator in order to be executed. With exception of GPIB interface, the device will also accept carriage return (CR) and combination of both (CRLF) as terminators. Inversely, device will always terminate its reply with CRLF or just LF in case of GPIB. The communication may look like this:

1. Controller> „RES 100;OUTP ON"+LF (ASCII code 10)
2. Device> „1.000000E+02 OHM"+LF
3. Device> „1"+LF

Used parameter types

Type	Description
<DNPD>	Decimal Numeric Program Data, this format is used to express decimal number with or without the exponent.
<CPD>	Character Program Data. Usually, it represents a group of alternative character parameters. E.g. { GPIB}.
<SPD>	String Program Data (quoted string). This type of parameter is similar to CPD, but allows transmission of more ISO characters.
?	A flag indicating a request for the value of the parameter specified by the command. No other parameter than the question mark can be used.
(?)	A flag indicating a request for the parameter specified by the command. This command permits a value to be set as well as requested.

3. Status Reporting

3.1. Status Data Structure-Register Model

Device meets standard protocol according to the standard IEEE488.2. The protocol can be used for checking of error and status behaviour of the device. It enables single-wire transmitting of SRQ command. The conditions on which SRQ signal (local control request) is sent can be set with commands *STB?, *SRE?, *SRE, *ESR?, *ESE?, *ESE a *CLS.
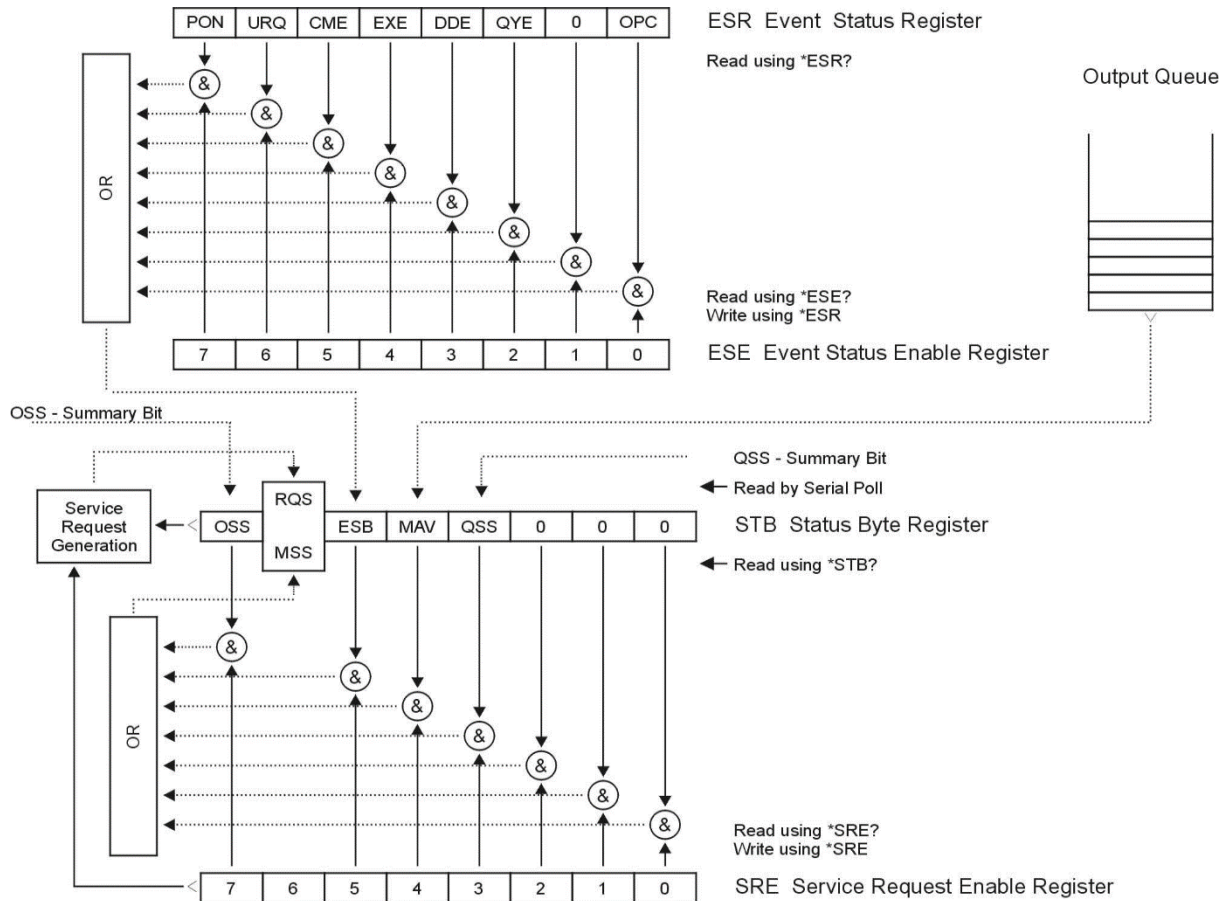

Figure 1 Status register overview

Status data structure contains following registers:

- STB – Status Byte Register
- SRE – Service Request Enable Register
- ESR – Event Status Register
- ESE – Event Status Enable Register
- Output Queue

3.2. Status Data Structure Registers

STB Status Byte Register

STB is main register where information from other status registers and from output queue is collected. Value of STB register is reset after switching on the device or after sending command *CLS. This command reset the STB register except bit MAV, which remains set if the output queue is not empty. STB register value can be read via serial message or through general query *STB?. Bit configuration of Status Byte Register is as follows:

RQS   Request Service, bit 6. The bit is read as a part of status byte only when serial message is sent.

MSS   Master Summary Status, bit 6. The MSS bit is set to 1 whenever bits ESB or MAV are 1 and enabled (1) in the SRE. This bit can be read using the *STB? command. His value is derived from STB and SRE status.

ESB   Event Summary Bit, bit 5. His value is derived from STB and SRE status. The ESB bit is set to 1 when one or more enabled ESR bits are set to 1.

MAV   Message Available, bit 4. The MAV bit is set to 1 whenever data is available in the M641 / M642 / M631 / M632 IEEE488 Output Queue (the response on query is ready).

SRE Service Request Enable Register

The Service Request Enable Register suppresses or allows the STB bits. "0" value of a SRE bit means, that the bit does not influence value of MSS bit. Value of any unmasked STB bit results in setting of the MSS bit to the level "1". SRE bit 6 is not influenced and its value is "0". The SRE register value can be set via the command *SRE followed by mask register value (0 – 191). The register can be read with the command *SRE?. The register is automatically resets after switching the device on. The register is not reset by the command *CLS.

ESR Event Status Register

Every bit of the EventStatusRegister corresponds to one event. Bit is set when the event is changed and it remains set also when the event passed. The ESR is cleared when the power is turned on (except bit PON which is set), and every time it is read via command *ESR? Or cleared with *CLS. Bit configuration of Event Status Register is as follows:

PON   Power On, bit 7. This event bit indicates that an off-to-on transition has occurred in the device's power supply.

URQ   User Request, bit 6. Bit is not used and it is always "0".

CME   Command Error, bit 5. This event bit indicates that an incorrectly formed command or query has been detected by the instrument.

EXE   Execution Error, bit 4. This event bit indicates that the received command cannot be executed, owing to the device state or the command parameter being out of limits.

DDE   Device Dependent Error, bit 3. This event bit indicates that an error has occurred which is neither a Command Error, a Query Error, nor an Execution Error. A Device-specific Error is any executed device operation that did not properly complete due to some condition, such as overload.

QYE   Query Error, bit 2. The bit is set if the device is addressed as talker and output queue is empty or if control unit did not pick up response before sending next query.

OPC   Operation Complete, bit 0. This event bit is generated in response to the *OPC command. It indicates that the device has completed all selected pending operations.

ESE Event Status Enable Register

The Event Status Enable Register allows one or more events in the Event Status Register to be reflected in the ESB summary-message bit. This register is defined for 8 bits, each corresponding to the bits in the Event Status Register. The Event Status Enable Register is read with the common query *ESE?. Data is returned as a binary-weighted value. The Event Status Enable Register is written to by the common command, *ESE. Sending the *ESE common command followed by a zero clears the ESE. The Event Status Enable Register is cleared upon power-on.

It suppresses or allows bits in ESR register. Value „0"of a bit of ESE register suppresses influence of appropriate bit of ESR register on value of sum bit of ESB status register. Setting of any unmask bit of ESR register results in setting of ESB status register. ESE register value can be modified by command *ESE followed by value of mask register (integer in range 0 –255). Reading of the register can be performed with command *ESE?. The register is automatically reset after switching on. The register is not reset with *CLS command.

Output Queue

The Output Queue stores response messages until they are read from control unit. If there is at minimum one sign in the output queue, MAV register (message available) is set. The Output Queue is cleared upon power-on and after reading all signs from output queue.

3.3.   SCPI Error codes

SCPI Remote control errors

Error	Message
-100	"Command error"
-101	"Invalid character"
-102	"Syntax error"
-103	"Invalid separator"
-104	"Data type error"
-105	"GET not allowed"
-108	"Parameter not allowed"
-109	"Missing parameter"
-112	"Program mnemonic too long"
-113	"Undefined header"
-114	"Header suffix out of range"
-120	"Numeric data error"
-121	"Invalid character in number"
-130	"Suffix error"
-141	"Invalid character data"
-144	"Character data too long"
-151	"Invalid string data"
-161	"Invalid block data"
-203	"Command protected"
-220	"Parameter error"
-222	"Data out of range"
-283	"Illegal variable name"
-350	"Queue overflow"
-400	"Query error"
-410	"Query INTERRUPTED"
-420	"Query UNTERMINATED"
-430	"Query DEADLOCKED"
-440	"Query UNTERMINATED after indefinite response"
514	"Command not allowed with GPIB"

4. M600 Series SCPI Command Reference

This chapter describes standard SCPI commands.

4.1.   SCPI Command Tree

This chapter summarizes all public SCPI commands supported by device in alphabetic order.

```
:CALibration
        :RESistance
                :AMPLitude(?) <DNPD>
                :SELect(?) <DNPD>
        :SECure
                :PASSword(?) <DNPD>
                :EXIT
:DISPlay
        :ANNotation
                :CLOCk
                        :DATE
                                :FORMat(?) {MDYS|MDYA|DMYS|DMYO|DMYA|YMDS|YMDO}
                        [:STATe](?) {ON|OFF|1|0}
        :BRIGhtness(?) <DNPD>
        :LANGuage(?) {ENGLish|DEUTsch|FRENch|RUSSian|SPANish|CZECh}
:OUTPut
        :SHORt(?) {ON|OFF|1|0}
        [:STATe](?) {ON|OFF|1|0}
        :SWITching(?) {FAST|SMOoth|OPEN|SHORt}
[:SOURce]
        :NICKel
                [:AMPLitude](?) <DNPD>[{CEL|FAR|K}]
                :ZRESistance(?) <DNPD>[OHM]
        :PLATinum
                [:AMPLitude](?) <DNPD>[{CEL|FAR|K}]
                :COEFficient(?) <DNPD>,<DNPD>,<DNPD>
                :STANdard(?) {PT385A|PT385B|PT3916|PT3926|USER}
                :ZRESistance(?) <DNPD>[OHM]
        :RESistance
                [:AMPLitude](?) <DNPD>[OHM]
        :TIMing
                :PCOunt? <DNPD>
                :PRESet
                        :NAME(?) <SPD>
                        :PCLear
                        :RAPPend <SPD>
                        :RCOunt? <DNPD>
                        :ROW<IND_ROW>
                                :AMPLitude(?) <SPD>
                                :RDELete
                        :SAVE
                :SELect(?) <DNPD>
        :UFUNction
                [:AMPLitude](?) <DNPD>
                :CURVe
                        :SELect(?) <DNPD>
                        :PCOunt? <DNPD>
                        :PRESet
```

```
                              :NAME(?) <SPD>
                              :PCLear
                              :RAPPend <SPD>
                              :RCOunt? <DNPD>
                              :ROW<IND_ROW>
                                     :AMPLitude(?) <SPD>
                                     :RDELete
                              :SAVE
                              :UNIT(?) <SPD>
:STATus
      :OPERation
             :CONDition(?) <DNPD>
             :ENABle(?) <DNPD>
             [:EVENt]? <DNPD>
             :NTRansition(?) <DNPD>
             :PTRansition(?) <DNPD>
      :QUEStionable
             :CONDition(?) <DNPD>
             :ENABle(?) <DNPD>
             [:EVENt]? <DNPD>
             :NTRansition(?) <DNPD>
             :PTRansition(?) <DNPD>
:SYSTem
      :BEEPer
             :STATe(?) {ON|OFF|1|0}
             :VOLume(?) <DNPD>
      :COMMunicate
             :BUS(?) {SERial|GPIB|USB|LAN}
             :GPIB
                    :ADDRess(?) <DNPD>
             :LAN
                    :ADDRess(?) <CPD>
                    :MASK(?) <CPD>
                    :GATE(?) <CPD>
                    :PORT(?) <DNPD>
                    :HOST(?) <CPD>
                    :DHCP(?) {ON|OFF|1|0}
             :RESTart
             :SERial
                    :BAUD(?) {1200|2400|4800|9600|19200|38400|57600|115200}
      :DATE(?) <DNPD>,<DNPD>,<DNPD>
      :ERRor
             [:NEXT]? <CPD>
      :KEY(?) <DNPD>
      :LOCal
      :PRESet
      :REMote
      :RWLock
      :TIME(?) <DNPD>,<DNPD>,<DNPD>
      :VERSion? <CPD>
:UNIT
      :TEMPerature(?) {CEL|FAR|K}
*CLS
*ESE(?)
*ESR?
*IDN?
```

*OPC(?)
*OPT?
*RST
*SRE(?)
*STB?
*TST?
*WAI

4.2. SCPI Standard Commands

*IDN?

Syntax:
    *IDN?
Description:
    This command returns the identification of the manufacturer, model, serial number and firmware revision.
Parameters:
  <CPD> manufacturer
  <CPD> model
  <DNPD>   serial number
  <DNPD>   firmware version
Remarks:
  Overlapped command
Example:
    *IDN? Response: MEATEST,M641,620151,1.00

*OPC

Syntax:
    *OPC
Description:
    This command sets the OPC bit in the ESR (Event Status Register) when all pending operations are complete.
Parameters:
  None
Remarks:
  Overlapped command
Example:
    *OPC

*OPC?

Syntax:
    *OPC?
Description:
    This command returns "1" to the output queue after all pending operations inside simulator are complete.
Parameters:
  <DNPD>   always returns 1
Remarks:
  Sequential command
Example:
    *OPC? Response: 1

*OPT?

Syntax:

*OPT?

Description:

This command return the instrument's hardware fitment. The only parameter returns presence of GPIB/LAN/USB interface.

Parameters:

<DNPD>   0 – extended interface not present, 1 – extended interface present

Remarks:

Overlapped command

Example:

*OPT? Response: 1

*WAI

Syntax:

*WAI

Description:

Prevents the instrument from executing any further commands or queries until all previous remote commands have been executed.

Parameters:

None

Remarks:

Sequential command

Example:

*WAI

*RST

Syntax:

*RST

Description:

This command resets the device to its initial factory-set state. This state may be different from the "Startup" preset.

Parameters:

None

Remarks:

Sequential command

Example:

*RST

*TST?

Syntax:

*TST?

Description:

This command launches internal self-test and returns result.

Parameters:

<DNPD>   0 – test passed, 1 – test failed

Remarks:

Sequential command

Example:

*TST? Response: 0

*STB?

Syntax:
   *STB?
Description:
   This query returns content of register STB, which carries the MSS bit status.
Parameters:
   \<DNPD\>   Status byte register, Range 0 … 255
Remarks:
   Overlapped command
Example:
   *STB? Response: 0

*SRE

Syntax:
   *SRE
   *SRE?
Description:
   This command allows set condition of the Service Request Enable register. Since bit 6 is not used, the maximum value is 191.
Parameters:
   \<DNPD\>   Service Request Enable register
Remarks:
   Overlapped command
Example:
   *SRE 2
   *SRE? Response: 2

*ESR?

Syntax:
   *ESR?
Description:
   This query returns the contents of the Event Status Register and clears the register.
Parameters:
   \<DNPD\>   Event Status Register
Remarks:
   Overlapped command
Example:
   *ESR? Response: 0

*ESE

Syntax:
   *ESE
   *ESE?
Description:
   This command programs the Event Status Enable register bits.
Parameters:
   \<DNPD\>   Event Status Enable register, Range 0 … 255
Remarks:
   Overlapped command
Example:
   *ESE 2
   *ESE? Response: 2

*CLS

Syntax:
>   *CLS

Description:
>   This command clears all status data structures in the device i.e. Event Status Register, Status Byte Register except the MAV bit, Operation Status Register, Questionable Status Register. Also error queue is cleared. Output queue is unaffected.

Parameters:
> None

Remarks:
> Overlapped command

Example:
>   *CLS

4.3.   SCPI Commands

This chapters describes all public SCPI commands in detailed form. The commands here are in alphabetic order.

:CALibration:RESistance:AMPLitude

Syntax:
>   :CALibration:RESistance:AMPLitude <DNPD>
>   :CALibration:RESistance:AMPLitude?

Description:
>   This command sets calibration value of particular internal resistance standard at output terminals including all parasitic resistances inside simulator.

Parameters:
>   <DNPD>   Standard resistance value in Ohms. Ranges and default values varies in accordance to selected resistance etalon (see table "Calibration points M641 / M642 / M631 / M632").

Remarks:
>   This command requires "Calibration" access
>   Overlapped command
>   Value is not affected by reset or by *RST command

Example:
>   CAL:RES:AMPL 1.944
>   CAL:RES:AMPL? Response: 1.944000E+00

:CALibration:RESistance:SELect

Syntax:
>   :CALibration:RESistance:SELect <DNPD>
>   :CALibration:RESistance:SELect?

Description:
>   This command enters calibration mode and selects internal resistance standard for calibration. Output terminals are automatically switched-on.

Parameters:
>   <DNPD>   Range 1 ... Max. Resistance Count, one based index of resistance standard

Remarks:
>   This command requires "Calibration" access
>   Overlapped command

Example:
>   CAL:RES:SEL 1
>   CAL:RES:SEL? Response: 1

:CALibration:SECure:PASSword

Syntax:
>:CALibration:SECure:PASSword <DNPD>

Description:
>This command validates entered password and enables calibration access if verification is successful. Access is invalidated after reset or if CAL:SEC:EXIT command is issued. Calibration password can be changed from simulator system menu *SETUP->Calibration->Change password.*

Parameters:
>| | |
>|---|---|
>| <DNPD> | Range 0 ... 4294967295 (default 0) |

Remarks:
>Overlapped command

Example:
>CAL:SEC:PASS 0

:CALibration:SECure:EXIT

Syntax:
>:CALibration:SECure:EXIT

Description:
>This command exits calibration mode and access.

Parameters:
>None

Remarks:
>Overlapped command

Example:
>CAL:SEC:EXIT

:DISPlay:ANNotation:CLOCk:DATE:FORMat

Syntax:
>:DISPlay:ANNotation:CLOCk:DATE:FORMat <CPD>
>:DISPlay:ANNotation:CLOCk:DATE:FORMat?

Description:
>This command sets format of date displayed on device screen.

Parameters:
>| <CPD> | {MDYS\|MDYA\|DMYS\|DMYO\|DMYA\|YMDS\|YMDO} (default MDYS) | |
>|---|---|---|
>| | ·MDYS | M/D/Y format   (M-month, D-day, Y-year) |
>| | ·MDYA | M-D-Y format |
>| | ·DMYS | D/M/Y format |
>| | ·DMYO | D.M.Y format |
>| | ·DMYA | D-M-Y format |
>| | ·YMDS | Y/M/D format |
>| | ·YMDO | Y.M.D format |

Remarks:
>Overlapped command
>Value is not affected by reset or by *RST command

Example:
>DISP:ANN:CLOC:DATE:FORM MDYS
>DISP:ANN:CLOC:DATE:FORM? Response: MDYS

:DISPlay:ANNotation:CLOCk[:STATe]

Syntax:

:DISPlay:ANNotation:CLOCk[:STATe] <BOOL>

:DISPlay:ANNotation:CLOCk[:STATe]?

Description:

This command enables/disables showing actual time in title on device screen

Parameters:

<BOOL>	{ON|OFF|1|0} (default 1)
·ON	actual time is shown
·OFF	actual time is hidden
·1	same as ON
·0	same as OFF

Remarks:

Overlapped command

Value is not affected by reset or by *RST command

Example:

DISP:ANN:CLOC ON

DISP:ANN:CLOC? Response: 1

:DISPlay:BRIGhtness

Syntax:

:DISPlay:BRIGhtness <DNPD>

:DISPlay:BRIGhtness?

Description:

This command sets brightness of device display.

Parameters:

<DNPD>   Range 0.0 ... 1.0 (default 1.0), 0.0 – Min, 1.0 – Max brightness

Remarks:

Overlapped command

Value is not affected by reset or by *RST command

Example:

DISP:BRIG 1.0

DISP:BRIG? Response: 1.000000E+00

:DISPlay:LANGuage

Syntax:

:DISPlay:LANGuage <CPD>

:DISPlay:LANGuage?

Description:

This command sets language that is used on device display.

Parameters:

<CPD>	{ENGLish|DEUTsch|FRENch|RUSSian|SPANish|CZECh} (default ENGL)
·ENGLish	english version
·DEUTsch	german version
·FRENch	french version
·RUSSian	russian version
·SPANish	spanish version
·CZECh	czech version

Remarks:

Overlapped command

Value is not affected by reset or by *RST command

Example:

DISP:LANG ENGL

DISP:LANG? Response: ENGL

:OUTPut:SHORt

Syntax:

:OUTPut:SHORt <BOOL>
:OUTPut:SHORt?

Description:

This command turns on short function. "Short" is activated only if output terminals are switched on (see OUTP:STAT command).

Parameters:

<BOOL>   {ON|OFF|1|0} (default 0)
·ON   short is set if output is on
·OFF   resistance is set if output is on
·1   same as ON
·0   same as OFF

Remarks:

Overlapped command
Value is set to default on reset and on *RST command

Example:

OUTP:SHOR ON
OUTP ON
OUTP:SHOR? Response: 1

:OUTPut[:STATe]

Syntax:

:OUTPut[:STATe] <BOOL>
:OUTPut[:STATe]?

Description:

This command switches ON/OFF output terminals. This command operates in conjunction with OUTP:SHOR command:

OUTP:STAT	OUTP:SHOR	Output terminals
OFF	OFF	Open
OFF	ON	Open
ON	OFF	Resistance
ON	ON	Short

Parameters:

<BOOL>   {ON|OFF|1|0} (default 0)
·ON   output terminals are switched on
·OFF   output terminals are switched off
·1   same as ON
·0   same as OFF

Remarks:

Overlapped command
Value is set to default on reset and on *RST command

Example:

OUTP ON
OUTP? Response: 1

:OUTPut:SWITching

Syntax:

    :OUTPut:SWITching <CPD>
    :OUTPut:SWITching?

Description:

    If output amplitude is changed and output terminals are already switched on, some glitches
    appear at output terminals. This setting allows selecting a method how new resistance at
    output terminals is achieved.

Parameters:

    <CPD>   {FAST|SMOoth|OPEN|SHORt} (default FAST)
        ·FAST new resistance is set as fast as possible
        ·SMOoth   new resistance is set with minimal output changes
        ·OPEN open function is activated before new resistance is set
        ·SHORt   short function is activated before new resistance is set

Remarks:

    Overlapped command
    Value is set according to "Startup" preset on restart and to default on *RST command

Example:

    OUTP:SWIT FAST
    OUTP:SWIT? Response: FAST

[:SOURce]:NICKel[:AMPLitude]

Syntax:

    [:SOURce]:NICKel[:AMPLitude] <DNPD>[<UNIT>]
    [:SOURce]:NICKel[:AMPLitude]?

Description:

    This command sets temperature in Nickel mode. Node SOUR:NICK also selects
    "NICKEL" function if not already selected. If unit parameter is part of temperature, new
    unit is set.

Parameters:

    <DNPD>   temperature at Nickel function. Default value is 100.0 °C.
        <UNIT>   {CEL|FAR|K}
            ·CEL   degrees of Celsius
            ·FAR   degrees of Fahrenheit
            ·K   Kelvin

Remarks:

    Overlapped command
    Value is set according to "Startup" preset on restart and to default on *RST command

Example:

    NICK 100.0
    NICK? Response: 1.000000E+02 CEL

[:SOURce]:NICKel:ZRESistance

Syntax:

[:SOURce]:NICKel:ZRESistance <DNPD>[<UNIT>]
[:SOURce]:NICKel:ZRESistance?

Description:

This command sets resistance at 0 °C for Nickel function.

Parameters:

<DNPD>   Range 100.0 ... 1000.0 (default 100.0).
   <UNIT>   {OHM}
      ·OHM

Remarks:

Overlapped command
Value is set according to "Startup" preset on restart and to default on *RST command

Example:

NICK:ZRES 100.0
NICK:ZRES? Response: 1.000000E+02 OHM

[:SOURce]:PLATinum[:AMPLitude]

Syntax:

[:SOURce]:PLATinum[:AMPLitude] <DNPD>[<UNIT>]
[:SOURce]:PLATinum[:AMPLitude]?

Description:

This command sets temperature in Platinum mode. Node SOUR:PLAT also selects "PLATINUM" function if not already selected. If unit parameter is part of temperature, new unit is set.

Parameters:

<DNPD>   temperature at Platinum function. Default value is 100.0 °C.
   <UNIT>   {CEL|FAR|K}
      ·CEL   degrees of Celsius
      ·FAR   degrees of Fahrenheit
      ·K   Kelvin

Remarks:

Overlapped command
Value is set according to "Startup" preset on restart and to default on *RST command

Example:

PLAT 100.0
PLAT? Response: 1.000000E+02 CEL

[:SOURce]:PLATinum:COEFficient

Syntax:

[:SOURce]:PLATinum:COEFficient <DNPD>,<DNPD>,<DNPD>
[:SOURce]:PLATinum:COEFficient?

Description:

This command allows to define Coefficients (A, B, C) used for "User" Platinum standard scale.

Parameters:

<DNPD>   Range 3.0e-3 ... 5.0e-3 (default 3.9083e-3), Coefficient A
<DNPD>   Range -7.0e-7 ... -5.0e-7 (default -5.775e-7), Coefficient B
<DNPD>   Range -5.0e-12 ... -3.0e-12 (default -4.18301e-12), Coefficient C

Remarks:

Overlapped command
Value is set according to "Startup" preset on restart and to default on *RST command

Example:

PLAT:COEF 3.9083e-3,-5.775e-7,-4.18301e-12
PLAT:COEF? Response: 3.908300E-03,-5.775000E-07,-4.183010E-12

[:SOURce]:PLATinum:STANdard

Syntax:

[:SOURce]:PLATinum:STANdard <CPD>
[:SOURce]:PLATinum:STANdard?

Description:

This command selects Platinum temperature standard.

Parameters:

<CPD> {PT385A|PT385B|PT3916|PT3926|USER} (default PT385A)

·PT385A	Pt385 (68) standard
·PT385B	Pt385 (90) standard
·PT3916	Pt3916 standard
·PT3926	Pt3926 standard
·USER	User (see PLAT:COEF command)

Remarks:

Overlapped command

Value is set according to "Startup" preset on restart and to default on *RST command

Example:

PLAT:STAN PT385A
PLAT:STAN? Response: PT385A

[:SOURce]:PLATinum:ZRESistance

Syntax:

[:SOURce]:PLATinum:ZRESistance <DNPD>[<UNIT>]
[:SOURce]:PLATinum:ZRESistance?

Description:

This command sets resistance at 0 °C for Platinum function.

Parameters:

<DNPD>   Range 100.0 ... 1000.0 (default 100.0).
<UNIT>   {OHM}
        ·OHM

Remarks:

Overlapped command

Value is set according to "Startup" preset on restart and to default on *RST command

Example:

PLAT:ZRES 100.0
PLAT:ZRES? Response: 1.000000E+02 OHM

[:SOURce]:RESistance[:AMPLitude]

Syntax:

[:SOURce]:RESistance[:AMPLitude] <DNPD>[<UNIT>]
[:SOURce]:RESistance[:AMPLitude]?

Description:

This command sets amplitude in Resistance mode. Node SOUR:RES also selects "RESISTANCE" function if not already selected. Optionally unit can be enclosed.

Parameters:

<DNPD>   Range 10.0 ... 300.0e3, default 100.0
<UNIT>   {OHM}
        ·OHM

Remarks:

Overlapped command

Value is set according to "Startup" preset on restart and to default on *RST command

Example:

RES 100.0
RES? Response: 1.000000E+02 OHM

[:SOURce]:TIMing:PCOunt?

Syntax:

[:SOURce]:TIMing:PCOunt?

Description:

This command retrieves maximum number of timing sequences. This number represents maximum index used in sequence commands.

Parameters:

<DNPD> Integer value representing maximum sequence count

Remarks:

Overlapped command

Example:

TIM:PCO? Response: 64

[:SOURce]:TIMing:PRESet:NAME

Syntax:

[:SOURce]:TIMing:PRESet:NAME <SPD>
[:SOURce]:TIMing:PRESet:NAME?

Description:

This command allows reading and changing sequence name. Data will be saved to non-volatile memory on TIM:PRES:SAVE command.

Parameters:

<SPD> Quoted sequence name. Upper alpha, lower alpha, digits and spaces are allowed. Maximum string size is 8 characters.

Remarks:

Overlapped command

Example:

TIM:PRES:NAME "TIME 1s"
TIM:PRES:NAME? Response: "TIME 1s"

[:SOURce]:TIMing:PRESet:PCLear

Syntax:

[:SOURce]:TIMing:PRESet:PCLear

Description:

This command clears existing sequence data including its timing table. Data will be saved to non-volatile memory on TIM:PRES:SAVE command.

Parameters:

None

Remarks:

Overlapped command

Example:

TIM:PRES:PCL

[:SOURce]:TIMing:PRESet:RAPPend

Syntax:

[:SOURce]:TIMing:PRESet:RAPPend <SPD>

Description:

This command appends new record at the end of timing table. Data will be saved to non-volatile memory on TIM:PRES:SAVE command.

Parameters:

<SPD>   Quoted string representing amplitude. The amplitude consists of two float numeric fields separated by comma. The first one represents timing interval in seconds and the second one amplitude in Ohms.

Remarks:

Overlapped command

Example:

TIM:PRES:RAPP "0.5,220.0"

[:SOURce]:TIMing:PRESet:RCOunt?

Syntax:

[:SOURce]:TIMing:PRESet:RCOunt?

Description:

This commands returns actual number of records in timing table.

Parameters:

<DNPD>   Integer value representing number of records

Remarks:

Overlapped command

Example:

TIM:PRES:RCO? Response: 6

[:SOURce]:TIMing:PRESet:ROW<IND_ROW>:AMPLitude

Syntax:

[:SOURce]:TIMing:PRESet:ROW<IND_ROW>:AMPLitude <SPD>
[:SOURce]:TIMing:PRESet:ROW<IND_ROW>:AMPLitude?

Description:

This command sets / retrieves selected row in timing table. Data will be saved to non-volatile memory on TIM:PRES:SAVE command.

Parameters:

<IND_ROW>   Range 1 ... Row count (1 - if omitted)

<SPD>   Quoted string representing amplitude. The amplitude consists of two float numeric fields separated by comma. The first one represents timing interval in seconds and the second one amplitude in Ohms.

Remarks:

Overlapped command

Example:

TIM:PRES:ROW1:AMPL "0.5,220.0"
TIM:PRES:ROW1:AMPL? Response: " 5.000000E-01,2.200000E+02"

[:SOURce]:TIMing:PRESet:ROW<IND_ROW>:RDELete

Syntax:

[:SOURce]:TIMing:PRESet:ROW<IND_ROW>:RDELete

Description:

This command deletes row from timing table. Data will be saved to non-volatile memory on TIM:PRES:SAVE command.

Parameters:

<IND_ROW>   Range 1 ... Row count (1 - if omitted)

Remarks:

Overlapped command

Example:

TIM:PRES:ROW1:RDEL

[:SOURce]:TIMing:PRESet:SAVE

Syntax:

[:SOURce]:TIMing:PRESet:SAVE

Description:

This command saves current sequence to non-volatile memory. Unsaved changes will disappear on restart, function change or selection of another sequence.

Parameters:

None

Remarks:

Overlapped command

Example:

TIM:PRES:SAVE

[:SOURce]:TIMing:SELect

Syntax:

[:SOURce]:TIMing:SELect <DNPD>
[:SOURce]:TIMing:SELect?

Description:

This command selects timing sequence. Selected sequence is shown on device display, can be executed using OUTP ON command and can be edited using SOUR:TIM:PRES group of commands.

Parameters:

<DNPD>   Range 1 ... 64 – maximum sequence count (default 1), one based index of sequence

Remarks:

Overlapped command

Value is set according to "Startup" preset on restart and to default on *RST command

Example:

TIM:SEL 1
TIM:SEL? Response: 1

[:SOURce]:UFUNction[:AMPLitude]

Syntax:

[:SOURce]:UFUNction[:AMPLitude] <DNPD>
[:SOURce]:UFUNction[:AMPLitude]?

Description:

This command sets amplitude in USER FUNCTION mode. Node SOUR:UFUN also selects "USER FUNCTION" function if not already selected.

Parameters:

<DNPD>　　　　　　Range depends on translation curve, default value is 1.0 or minimal value that can be set

Remarks:

Overlapped command

Value is set according to "Startup" preset on restart and to default on *RST command

Example:

UFUN 1.0
UFUN? Response: 1.000000E+00

[:SOURce]:UFUNction:CURVe:SELect

Syntax:

[:SOURce]:UFUNction:CURVe:SELect <DNPD>
[:SOURce]:UFUNction:CURVe:SELect?

Description:

This command selects conversion curve. Selected curve is activated on device display and can be edited using SOUR:UFUN:CURV:PRES group of commands.

Parameters:

<DNPD>　　　　　　Range 1 ... 64 – Maximum curve count (default 1), one based index of curve

Remarks:

Overlapped command

Value is set according to "Startup" preset on restart and to default on *RST command

Example:

UFUN:CURV:SEL 1
UFUN:CURV:SEL? Response: 1

[:SOURce]:UFUNction:CURVe:PCOunt?

Syntax:

[:SOURce]:UFUNction:CURVe:PCOunt?

Description:

This command retrieves maximum number of user function presets. This number represents maximum index used in preset commands.

Parameters:

<DNPD>　　　　　　Integer value representing maximum number of curves

Remarks:

Overlapped command

Example:

UFUN:CURV:PCO? Response: 64

[:SOURce]:UFUNction:CURVe:PRESet:NAME

Syntax:

[:SOURce]:UFUNction:CURVe:PRESet:NAME <SPD>
[:SOURce]:UFUNction:CURVe:PRESet:NAME?

Description:

This command allows reading and changing selected curve name. Data will be saved to non-volatile memory on UFUN:CURV:PRES:SAVE command.

Parameters:

<SPD>   Quoted curve name. Upper alpha, lower alpha, digits and spaces are allowable. Maximum string size is 8 characters.

Remarks:

Overlapped command

Example:

UFUN:CURV:PRES:NAME "CURVE 2"
UFUN:CURV:PRES:NAME? Response: "CURVE 2"

[:SOURce]:UFUNction:CURVe:PRESet:PCLear

Syntax:

[:SOURce]:UFUNction:CURVe:PRESet:PCLear

Description:

This command deletes existing curve including its lookup table. Data will be saved to non-volatile memory on UFUN:CURV:PRES:SAVE command.

Parameters:

None

Remarks:

Overlapped command

Example:

UFUN:CURV:PRES:PCL

[:SOURce]:UFUNction:CURVe:PRESet:RAPPend

Syntax:

[:SOURce]:UFUNction:CURVe:PRESet:RAPPend <SPD>

Description:

This command appends new record at the end of lookup table. Data will be saved to non-volatile memory on UFUN:CURV:PRES:SAVE command.

Parameters:

<SPD>   Quoted string representing amplitude. The amplitude consists of two float numeric fields separated by comma. The first one represents amplitude in "User Function" units and the second one amplitude in Ohms.

Remarks:

Overlapped command

Example:

UFUN:CURV:PRES:RAPP "10.6,220.0"

[:SOURce]:UFUNction:CURVe:PRESet:RCOunt?

Syntax:

[:SOURce]:UFUNction:CURVe:PRESet:RCOunt?

Description:

This commands returns actual number of records in curve table.

Parameters:

<DNPD>   Integer value representing number of records for particular curve table

Remarks:

Overlapped command

Example:

UFUN:CURV:PRES:RCO? Response: 2

[:SOURce]:UFUNction:CURVe:PRESet:ROW<IND_ROW>:AMPLitude

Syntax:

[:SOURce]:UFUNction:CURVe:PRESet:ROW<IND_ROW>:AMPLitude <SPD>
[:SOURce]:UFUNction:CURVe:PRESet:ROW<IND_ROW>:AMPLitude?

Description:

This command sets / retrieves selected row in curve table. Data will be saved to non-volatile memory on UFUN:CURV:PRES:SAVE command.

Parameters:

<IND_ROW>   Range 1 ... Row count (1 - if omitted)
<SPD>   Quoted string representing amplitude. The amplitude consists of two float numeric fields separated by comma. The first one represents amplitude in "User Function" units and the second one amplitude in Ohms.

Remarks:

Overlapped command

Example:

UFUN:CURV:PRES:ROW1:AMPL "10.6,220.0"
UFUN:CURV:PRES:ROW1:AMPL? Response: "1.060000E+01,2.200000E+2"

[:SOURce]:UFUNction:CURVe:PRESet:ROW<IND_ROW>:RDELete

Syntax:

[:SOURce]:UFUNction:CURVe:PRESet:ROW<IND_ROW>:RDELete

Description:

This command deletes row from curve table. Data will be saved to non-volatile memory on UFUN:CURV:PRES:SAVE command.

Parameters:

<IND_ROW>   Range 1 ... Row count (1 - if omitted)

Remarks:

Overlapped command

Example:

UFUN:CURV:PRES:ROW1:RDEL

[:SOURce]:UFUNction:CURVe:PRESet:SAVE

Syntax:

[:SOURce]:UFUNction:CURVe:PRESet:SAVE

Description:

This command saves current curve to non-volatile memory. Unsaved changes will disappear on restart, function change or selection of another curve.

Parameters:

None

Remarks:

Overlapped command

Example:

UFUN:CURV:PRES:SAVE

[:SOURce]:UFUNction:CURVe:PRESet:UNIT

Syntax:

[:SOURce]:UFUNction:CURVe:PRESet:UNIT <SPD>
[:SOURce]:UFUNction:CURVe:PRESet:UNIT?

Description:

This command sets / retrieves unit of selected curve. Data will be saved to non-volatile memory on UFUN:CURV:PRES:SAVE command.

Parameters:

<SPD>   Quoted user function unit. Upper alpha, lower alpha, digits and spaces are allowable. Maximum string size is 2 characters.

Remarks:

Overlapped command

Example:

UFUN:CURV:PRES:UNIT "N"
UFUN:CURV:PRES:UNIT? Response: "N"

:STATus:OPERation:CONDition

Syntax:

:STATus:OPERation:CONDition?

Description:

This query returns the content of Operational Condition register. It is a decimal value which corresponds to the binary-weighted sum of all bits in the register. Register is not cleared after this query. The response to the query therefore represents an instantaneous 'Snapshot' of the register state, at the time that the query was accepted.

Parameters:

<DNPD>   Operational Condition register

Remarks:

Overlapped command

Example:

STAT:OPER:COND? Response: 2

:STATus:OPERation:ENABle

Syntax:

:STATus:OPERation:ENABle <DNPD>
:STATus:OPERation:ENABle?

Description:

This command enables bits in the Operational Data Enable register. Selected bits are summarized at bit 7 (OSS) of the IEEE488.2 Status Byte register.

Parameters:

<DNPD>   Operational Data Enable register

Remarks:

Overlapped command

Example:

STAT:OPER:ENAB 2
STAT:OPER:ENAB? Response: 2

:STATus:OPERation[:EVENt]?

Syntax:

:STATus:OPERation[:EVENt]?

Description:

This query returns the content of Operational Data Event register. It is a decimal value which corresponds to the binary-weighted sum of all bits set in the register. Register is cleared after this query.

Parameters:

<DNPD>   Operational Data Event register

Remarks:

Overlapped command

Example:

STAT:OPER? Response: 0

:STATus:OPERation:NTRansition

Syntax:

:STATus:OPERation:NTRansition <DNPD>
:STATus:OPERation:NTRansition?

Description:

This command allows set Operation Negative Transition Register. It is a decimal value which corresponds to the binary-weighted sum of all bits set in the register. Setting a bit in the negative transition filter shall cause a 1 to 0 transition in the corresponding bit of the associated condition register to cause a 1 to be written in the associated bit of the corresponding event register.

Parameters:

<DNPD>   Operation Negative Transition Register, Range 0… 32767

Remarks:

Overlapped command

Example:

STAT:OPER:NTR 2
STAT:OPER:NTR? Response: 2

:STATus:OPERation:PTRansition

Syntax:

:STATus:OPERation:PTRansition <DNPD>

:STATus:OPERation:PTRansition?

Description:

This command allows set Operation Positive Transition Register. It is a decimal value which corresponds to the binary-weighted sum of all bits set in the register. Setting a bit in the positive transition filter shall cause a 0 to 1 transition in the corresponding bit of the associated condition register to cause a 1 to be written in the associated bit of the corresponding event register.

Parameters:

    <DNPD>   Operation Positive Transition Register, Range 0 … 32767

Remarks:

Overlapped command

Example:

STAT:OPER:PTR 1.0

STAT:OPER:PTR? Response: 1.000000E+00

:STATus:QUEStionable:CONDition

Syntax:

:STATus:QUEStionable:CONDition?

Description:

This query returns the content of Questionable Condition register. It is a decimal value which corresponds to the binary-weighted sum of all bits in the register. Register is not cleared after this query. The response to the query therefore represents an instantaneous 'Snapshot' of the register state, at the time that the query was accepted.

Parameters:

    <DNPD>   Questionable Condition register

Remarks:

Overlapped command

Example:

STAT:QUES:COND? Response: 2

:STATus:QUEStionable:ENABle

Syntax:

:STATus:QUEStionable:ENABle <DNPD>

:STATus:QUEStionable:ENABle?

Description:

This command enables bits in the Questionable Data Enable register. Selected bits are summarized at bit 3 (QSS) of the IEEE488.2 Status Byte register.

Parameters:

    <DNPD>   Questionable Data Enable register

Remarks:

Overlapped command

Example:

STAT:QUES:ENAB 2

STAT:QUES:ENAB? Response: 2

:STATus:QUEStionable[:EVENt]?

Syntax:
:STATus:QUEStionable[:EVENt]?

Description:
This query returns the content of Questionable Data Event register. It is a decimal value which corresponds to the binary-weighted sum of all bits set in the register. Register is cleared after this query.

Parameters:
<DNPD>   Questionable Data Event register

Remarks:
Overlapped command

Example:
STAT:QUES? Response: 0

:STATus:QUEStionable:NTRansition

Syntax:
:STATus:QUEStionable:NTRansition <DNPD>
:STATus:QUEStionable:NTRansition?

Description:
This command allows set Questionable Negative Transition Register. It is a decimal value which corresponds to the binary-weighted sum of all bits set in the register. Setting a bit in the negative transition filter shall cause a 1 to 0 transition in the corresponding bit of the associated condition register to cause a 1 to be written in the associated bit of the corresponding event register.

Parameters:
<DNPD>   Questionable Negative Transition Register, Range 0… 32767

Remarks:
Overlapped command

Example:
STAT:QUES:NTR 2
STAT:QUES:NTR? Response: 2

:STATus:QUEStionable:PTRansition

Syntax:
:STATus:QUEStionable:PTRansition <DNPD>
:STATus:QUEStionable:PTRansition?

Description:
This command allows set Questionable Positive Transition Register. It is a decimal value which corresponds to the binary-weighted sum of all bits set in the register. Setting a bit in the positive transition filter shall cause a 0 to 1 transition in the corresponding bit of the associated condition register to cause a 1 to be written in the associated bit of the corresponding event register.

Parameters:
<DNPD>   Questionable Positive Transition Register, Range 0… 32767

Remarks:
Overlapped command

Example:
STAT:QUES:PTR 2
STAT:QUES:PTR? Response: 2

:SYSTem:BEEPer:STATe

Syntax:
>   :SYSTem:BEEPer:STATe <BOOL>
>   :SYSTem:BEEPer:STATe?

Description:
>   This command sets state of device beeper.

Parameters:
>   <BOOL>   {ON|OFF|1|0} (default 1)
>   ·ON   device system beeper is enabled
>   ·OFF   device system beeper is disabled
>   ·1   same as ON
>   ·0   same as OFF

Remarks:
>   Overlapped command
>   Value is not affected by reset or by *RST command

Example:
>   SYST:BEEP:STAT ON
>   SYST:BEEP:STAT? Response: 1

:SYSTem:BEEPer:VOLume

Syntax:
>   :SYSTem:BEEPer:VOLume <DNPD>
>   :SYSTem:BEEPer:VOLume?

Description:
>   This command sets the system device beeper volume.

Parameters:
>   <DNPD>   Range 0.0 ... 1.0 (Max. volume) (default 0.2)

Remarks:
>   Overlapped command
>   Value is not affected by reset or by *RST command

Example:
>   SYST:BEEP:VOL 0.2
>   SYST:BEEP:VOL? Response: 2.000000E-01

:SYSTem:COMMunicate:BUS

Syntax:
>   :SYSTem:COMMunicate:BUS <CPD>
>   :SYSTem:COMMunicate:BUS?

Description:
>   This command selects communication interface.

Parameters:
>   <CPD>   {SERial|GPIB|USB|LAN} (default SER)
>   ·SERialRS232 interface
>   ·GPIB   GPIB interface
>   ·USB   USB interface
>   ·LAN   LAN interface

Remarks:
>   Sequential command
>   Value is not affected by reset or by *RST command

Example:
>   SYST:COMM:BUS SER
>   SYST:COMM:BUS? Response: SER

:SYSTem:COMMunicate:GPIB:ADDRess

    Syntax:
        :SYSTem:COMMunicate:GPIB:ADDRess <DNPD>
        :SYSTem:COMMunicate:GPIB:ADDRess?
    Description:
        This commands allows set communication GPIB address
    Parameters:
        <DNPD>   Range 1 ... 31 (default 2)
    Remarks:
        Overlapped command
        Value is not affected by reset or by *RST command
    Example:
        SYST:COMM:GPIB:ADDR 2
        SYST:COMM:GPIB:ADDR? Response: 2

:SYSTem:COMMunicate:LAN:ADDRess

    Syntax:
        :SYSTem:COMMunicate:LAN:ADDRess <CPD>
        :SYSTem:COMMunicate:LAN:ADDRess?
    Description:
        This command allows to change IP address if DHCP is switched off. Interface must be restarted to take effect (see SYST:COMM:REST command).
    Parameters:
        <CPD>   Range 000.000.000.000 ... 255.255.255.255 (default 192.168.001.100)
    Remarks:
        Overlapped command
        Value is not affected by reset or by *RST command
    Example:
        SYST:COMM:LAN:ADDR 192.168.001.100
        SYST:COMM:LAN:ADDR? Response: 192.168.001.100

:SYSTem:COMMunicate:LAN:MASK

    Syntax:
        :SYSTem:COMMunicate:LAN:MASK <CPD>
        :SYSTem:COMMunicate:LAN:MASK?
    Description:
        This command allows to change subnet mask if DHCP is switched off. Interface must be restarted to take effect (see SYST:COMM:REST command).
    Parameters:
        <CPD>   Range 000.000.000.000 ... 255.255.255.255 (default 255.255.255.000)
    Remarks:
        Overlapped command
        Value is not affected by reset or by *RST command
    Example:
        SYST:COMM:LAN:MASK 255.255.255.000
        SYST:COMM:LAN:MASK? Response: 255.255.255.000

:SYSTem:COMMunicate:LAN:GATE

Syntax:

:SYSTem:COMMunicate:LAN:GATE <CPD>

:SYSTem:COMMunicate:LAN:GATE?

Description:

This command allows to change default gateway if DHCP is switched off. Interface must be restarted to take effect (see SYST:COMM:REST command).

Parameters:

<CPD>   Range 000.000.000.000 ... 255.255.255.255 (default 255.255.255.255)

Remarks:

Overlapped command

Value is not affected by reset or by *RST command

Example:

SYST:COMM:LAN:GATE 255.255.255.255

SYST:COMM:LAN:GATE? Response: 255.255.255.255

:SYSTem:COMMunicate:LAN:PORT

Syntax:

:SYSTem:COMMunicate:LAN:PORT <DNPD>

:SYSTem:COMMunicate:LAN:PORT?

Description:

This command allows to change port number. Interface must be restarted to take effect (see SYST:COMM:REST command).

Parameters:

<DNPD>   Range 0 ... 9999 (default 23)

Remarks:

Overlapped command

Value is not affected by reset or by *RST command

Example:

SYST:COMM:LAN:PORT 23

SYST:COMM:LAN:PORT? Response: 23

:SYSTem:COMMunicate:LAN:HOST

Syntax:

:SYSTem:COMMunicate:LAN:HOST <CPD>

:SYSTem:COMMunicate:LAN:HOST?

Description:

This command allows to change host name if DHCP is switched on. Interface must be restarted to take effect (see SYST:COMM:REST command).

Parameters:

<CPD>   Upper alpha, lower alpha, digits, underscores and spaces are allowable. Maximum string size is 14 characters.

Remarks:

Overlapped command

Value is not affected by reset or by *RST command

Example:

SYST:COMM:LAN:HOST M641_SNXXXXXX

SYST:COMM:LAN:HOST? Response: M641_SNXXXXXX

:SYSTem:COMMunicate:LAN:DHCP

Syntax:
:SYSTem:COMMunicate:LAN:DHCP <BOOL>
:SYSTem:COMMunicate:LAN:DHCP?
Description:
This command allows switch On/Off DHCP.
Parameters:
<BOOL>   {ON|OFF|1|0} (default 1)
·ON   DHCP is On
·OFF   DHCP is Off
·1   same as ON
·0   same as OFF
Remarks:
Overlapped command
Value is not affected by reset or by *RST command
Example:
SYST:COMM:LAN:DHCP ON
SYST:COMM:LAN:DHCP? Response: 1

:SYSTem:COMMunicate:RESTart

Syntax:
:SYSTem:COMMunicate:RESTart
Description:
This command will restart communication interface. It will take several seconds. During this period device will not respond to any commands. Restart is needed for all LAN setting changes.
Parameters:
None
Remarks:
Overlapped command
Example:
SYST:COMM:REST

:SYSTem:COMMunicate:SERial:BAUD

Syntax:
:SYSTem:COMMunicate:SERial:BAUD <CPD>
:SYSTem:COMMunicate:SERial:BAUD?
Description:
This command allows changing RS232 transfer rate.
Parameters:
<CPD>   {1200|2400|4800|9600|19200|38400|57600|115200} (default 9600)
·1200   1200 Bd
·2400   2400 Bd
·4800   4800 Bd
·9600   9600 Bd
·19200 19200 Bd
·38400 38400 Bd
·57600 57600 Bd
·115200   115200 Bd
Remarks:
Overlapped command
Value is not affected by reset or by *RST command
Example:
SYST:COMM:SER:BAUD 9600
SYST:COMM:SER:BAUD? Response: 9600

:SYSTem:DATE

Syntax:

:SYSTem:DATE <DNPD>,<DNPD>,<DNPD>

:SYSTem:DATE?

Description:

This commands allows to change system device date.

Parameters:

<DNPD>   Year, Range 2000 ... 2063

<DNPD>   Month, Range 1 ... 12

<DNPD>   Day, Range 1 ... 31

Remarks:

Overlapped command

Example:

SYST:DATE 2012,12,31

SYST:DATE? Response: 2012,12,31

:SYSTem:ERRor[:NEXT]?

Syntax:

:SYSTem:ERRor[:NEXT]?

Description:

This command reads SCPI error (maximum 32) that occurred at first. If number of SCPI errors exceed 32, error -350 "Queue overflow" is returned. For all available error codes and messages see "SCPI Error codes" table. Error queue is cleared by reading all errors or by issuing *CLS command.

Parameters:

<DNPD>   Error code

<SPD>   Quoted error message

Remarks:

Overlapped command

Example:

SYST:ERR? Response: -300,"Device error"

:SYSTem:KEY

Syntax:

:SYSTem:KEY <DNPD>

:SYSTem:KEY?

Description:

This command allows send key code to the device the same way the user can press keys on front panel. Query returns last pressed key.

Key	Code
KEY_0	12
KEY_1	11
KEY_2	15
KEY_3	19
KEY_4	10
KEY_5	14
KEY_6	18
KEY_7	9
KEY_8	13
KEY_9	17
KEY_SELECT	25
KEY_ENTER	24
KEY_CANCEL	23
KEY_UP	2
KEY_DOWN	1
KEY_LEFT	3
KEY_RIGHT	4
KEY_EXPONENT	21
KEY_BACKSPACE	22
KEY_POINT	16
KEY_USER_1	5
KEY_USER_2	6
KEY_USER_3	7
KEY_USER_4	8
KEY_SIGN	20
KEY_OPER	26
KEY_SHORT	27

Parameters:

<DNPD> Key code. For particular key codes see table above.

Remarks:

Overlapped command

Example:

SYST:KEY 12

SYST:KEY? Response: 12

:SYSTem:LOCal

Syntax:
:SYSTem:LOCal
Description:
This command places device in the LOCAL mode and unlocks all keys on front panel of the device. The Command is valid only for RS232, LAN and USB interfaces. The device will not respond to commands in LOCAL mode.
Parameters:
None
Remarks:
Overlapped command
Example:
SYST:LOC

:SYSTem:PRESet

Syntax:
:SYSTem:PRESet
Description:
This command will set all device (functions) parameters to default. The same as *RST without an actual restart.
Parameters:
None
Remarks:
Overlapped command
Example:
SYST:PRES

:SYSTem:REMote

Syntax:
:SYSTem:REMote
Description:
This command places device in the REMOTE mode and locks all keys but LOCAL key. The Command is valid only for RS232, LAN and USB interfaces. The device will not respond to any other command until is in REMOTE mode.
Parameters:
None
Remarks:
Overlapped command
Example:
SYST:REM

:SYSTem:RWLock

Syntax:
:SYSTem:RWLock
Description:
This command places device in the REMOTE mode and locks all keys including LOCAL key. The Command is valid only for RS232, LAN, USB interfaces. The device will not respond to any other command until is in REMOTE mode.
Parameters:
None
Remarks:
Overlapped command
Example:
SYST:RWL

:SYSTem:TIME

Syntax:
:SYSTem:TIME <DNPD>,<DNPD>,<DNPD>
:SYSTem:TIME?
Description:
This commands allows set system device time (RTC).
Parameters:
<DNPD>   Hours, Range 0 ... 23
<DNPD>   Minutes, Range 0 ... 59
<DNPD>   Seconds, Range 0 ... 59
Remarks:
Overlapped command
Example:
SYST:TIME 10,45,15
SYST:TIME? Response: 10,45,15

:SYSTem:VERSion?

Syntax:
:SYSTem:VERSion?
Description:
This query retrieves version of implemented SCPI language
Parameters:
<CPD>   SCPI language version
Remarks:
Overlapped command
Example:
SYST:VERS? Response: 1999.0

:UNIT:TEMPerature

Syntax:
:UNIT:TEMPerature <CPD>
:UNIT:TEMPerature?
Description:
This function allows to set unit for all temperature functions (Platinum, Nickel).
Parameters:
<CPD>   {CEL|FAR|K} (default CEL)
·CEL   degrees of Celsius
·FAR   degrees of Fahrenheit
·K   Kelvin
Remarks:
Overlapped command
Value is set according to "Startup" preset on restart and to default on *RST command
Example:
UNIT:TEMP CEL
UNIT:TEMP? Response: CEL

4.5. Compatible Commands

RTD simulator also responds to "Old style" command syntax to provide compatibility with previous decade box models.

Value setting / reading
A (?) <DNPD>

The command sets resistance value (resistance function) or temperature value (temperature sensor simulating function).

<DNPD>
Represents resistance value in Ohm or simulated temperature in selected temperature unit. When temperature parameter is used, both negative and positive values are acceptable. For resistance parameter positive value only is acceptable. Limit values are shown in chapter "Technical data".

In case of control, the simulator confirms correct setting with string „Ok<cr><lf>".

In case of query, M641 / M642 / M631 / M632 returns set resistance/temperature value in the same format as it is on the display (number of decimal places). For example value -120 °C is returned as -120.000<cr><lf>. Positive numbers are sent without polarity sign.

Example:

Command „A123.564 <cr>" sets temperature 123.564 °C when in temperature function, 123.564 Ω when in resistance function.

On „A?<cr>" query simulator returns response in format „123.564<cr><lf>".

RTD simulator function setting
F <CPD> { 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | S | O }

Following function can be set:

- 0 resistance mode
- 1 Pt385 (68) temperature sensor simulation
- 2 Pt385 (90) temperature sensor simulation
- 3 Pt3916 temperature sensor simulation
- 4 Ni temperature sensor simulation
- 5 User platinum temperature sensor simulation
- 6 Pt3926 temperature sensor simulation
- 7 User function simulation
- S Short
- O Open

M641 / M642 / M631 / M632 confirms execution with string „Ok<cr><lf>".
Example:

„F1<cr>" sets Pt100 sensor simulation.

I/D (device identification)
*IDN?

Response contains name of manufacturer, model type number, serial number, firmware version

Example:

If query „*IDN?<cr>" is sent, simulator returns response:

„MEATEST,M64x/M63x,622351,1.2 <cr><lf>".

R0 setting / reading
R (?) <DNPD>

Command sets resistance value R0 at temperature 0 °C. Set value R0 is valid for all types of simulated temperature sensors.

<DNPD>
It represents resistance value R0 in Ω. Limits are shown in chapter Technical data. M641 / M642 / M631 / M632 confirms execution with string „Ok<cr><lf>". In case of query M641 / M642 / M631 / M632 returns set value in Ω.

Example:

„R100<cr>" sets value R0 to 100 Ω (Pt100, Ni100).

After query „R?<cr>" simulator returns string „100<cr><lf>".

Temperature unit setting
U <CPD> { 0 | 1 | 2 }

Command sets used temperature unit.

- 0   sets degree Celsius °C
- 1   sets degree Fahrenheit °F
- 2   sets Kelvin unit K

M641 / M642 / M631 / M632 confirms execution with string „Ok<cr><lf>".

Example:

„U0<cr>" sets °C as temperature unit.

Status reading
V?

M641 / M642 / M631 / M632 returns device status in form „FxUx<cr><lf>". On positions of signs „x" there are values corresponding to the actual status of the simulator.

Example:

After query „V?<cr>" the simulator returns for example string „F2U0<cr><lf>", which means Pt (90), °C actual setting.

Correctly executed command is confirmed with string "Ok<cr><lf>. When correct query is received M641 / M642 / M631 / M632 returns response in above-described format. All commands must contain sign <cr> or <lf> at the end. Both small and large letters can be used.