

THE MEASURABLE DIFFERENCE.



DEWETRON

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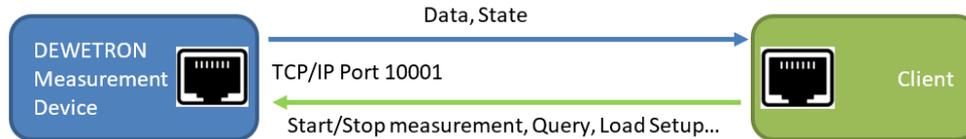
# OXYGEN TRAINING > SCPI





# SCPI – THE GENERIC INTERFACE

SCPI is a plain text interface via Ethernet. It is used almost everywhere in the measurement automation area and is somehow standardized. The Communication is performed with Commands and Queries. This Interface is also used together with DATA STREAM as Control Layer.



The Data Output via SCPI is performed via cyclic fetching the data from the client application. Each query results in a single value (from 1 to n channels) or an array of values, if the ELOG buffered readout is used.

## > Single value fetching

Timestamp	TS1	TS2	TS3	TS4	TS5	TS6	TS7	TS8
	Val1	Val2	Val3	Val4	Val5	Val6	Val7	Val8
SCPI Query		^		^	^			
SCPI Result		Val2		Val4,Val4	Val5			

## > Buffered Data Fetching

Since we've seen, that it is potentially possible, that the same value can be fetched more than once and gaps can occur, we introduced the buffered readout (short ELOG, External Logging)

Timestamp	TS1	TS2	TS3	TS4	TS5	TS6	TS7	TS8
	Val1	Val2	Val3	Val4	Val5	Val6	Val7	Val8
SCPI Query			^				^	
SCPI Result			Val1,2,3				Val4,5,6,7	

## > Measurement Control

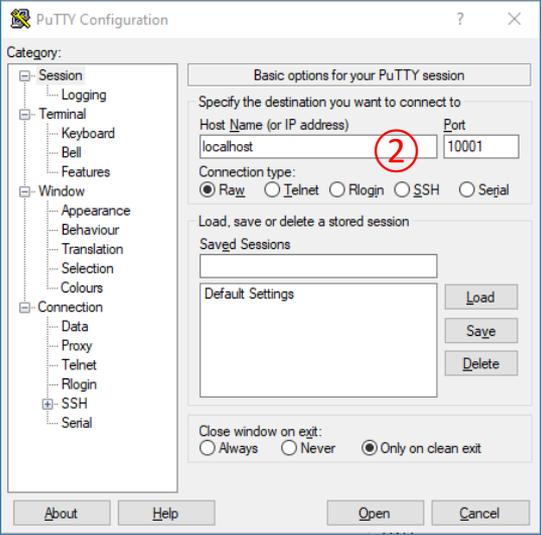
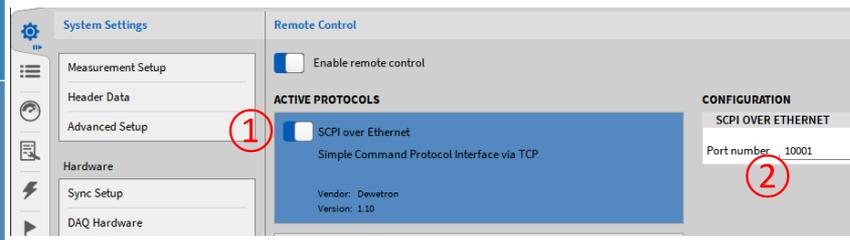
SCPI offers a wide command set for controlling the measurement device, like Start/Stop Measurement and Load/Save Setup.

Physical Interface	Ethernet
Communication Layer	TCP/IP, Default Port 10001
Language	Plain Text
Data Output Capability	Single value Fetch (Scalar and Array values) and Data Buffer Fetch (ELOG)
Control Capability	Start/Stop Measurement, Save/Load Setup, Fetch single and buffered Data
Implementation Complexity	Low
Timestamping/ Sync	Optionally Absolute or relative Timestamp provided with the Values

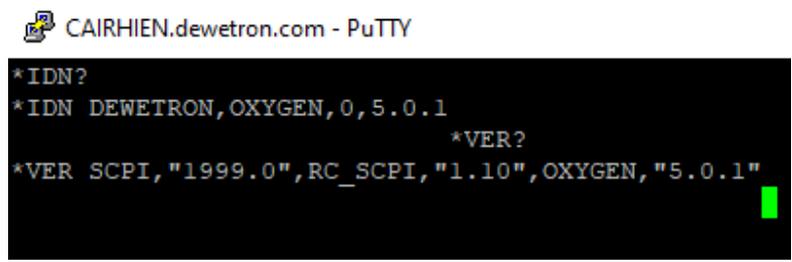


# GETTING STARTED AND BASICS

- ① Enable SCPI in Oxygen
- Start Putty  
Installation required:  
<https://www.chiark.greenend.org.uk/~sgtatham/putty/latest.html>
- ② Connect RAW to "localhost" and Port 10001



Command	Description
*IDN?	Get Device ID
*VER?	Get Detailed Version Information of IF
:COMM:HEAD OFF	Disable Header at Response
*IDN?	
:IDN?	Send Invalid Command (: instead of *)
:SYST:ERR:ALL?	Check Error Queue



# LOAD SETUP & START/STOP MEASUREMENT



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Command	Description
:SETUP:LOAD "scpi_demo"	Load Setup scpi_demo.dms from default folder path
:ACQU:STAT?	Check if Acquisition is running
:STORE:START	Start measurement and storing according to recording settings
:STORE:STAT?	Check State of Measurement
:STORE:STOP	Stop measurement
:STORE:STAT?	Check State of Measurement
:STORE:FILE:NAME "Test1"	Set Measurement file name to Test1.dmd
:STORE:START	
:STORE:STOP	
:STORE:START	Start Measurement with file name Test1.dmd (will be overwritten!)
:STORE:STOP	

```
:SETUP:LOAD "scpi_demo"  
:ACQU:STAT?  
:ACQU:STAT Started  
:STORE:START  
:STORE:STOP  
:STORE:STAT?  
:STORE:STAT Stopped  
:STORE:FILE:NAME "test1"  
:STORE:START  
:STORE:STOP  
:STORE:START  
:STORE:STOP
```

# FETCH MEASUREMENT VALUES (NUMERIC SYSTEM)



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Command	Description
<code>:NUM:NORM:ITEMS "AI 1/1 Sim"</code>	Set Channel List to AI 1/1 Sim
<code>:NUM:NORM:ITEMS?</code>	Query actual channel list
<code>:NUM:NORM:NUM?</code>	Query maximum number of transferred channels (even if channellist is longer)
<code>:NUM:NORM:NUM ALL</code>	Set to all items in channel list
<code>:NUM:NORM:DIMS?</code>	Read Channel Dimensions of all channels in channellist
<code>:RATE 100ms</code>	Set averaging interval to 100ms (Attention: Interval is not exact -> BUG)
<code>:NUM:NORM:ITEMS "ABS-TIME", "AI 1/1 Sim"</code>	Set Channel List to Absolute Time, AI 1/1 Sim
<code>:NUM:NORM:VAL?</code>	Fetch Measurement Values

```
                                :NUM:NORM:ITEM "AI 1/1 Sim"
:NUM:NORM:ITEMS?
:NUM:ITEMS "AI 1/1 Sim"
                                :NUM:NORM:NUM?
:NUM:NUM 15
                                :NUM:NORM:DIMS?
:NUM:DIMS 1
                                :RATE 100ms
                                NUM:NORM:ITEMS "ABS-TIME", "AI 1/1 Sim"
NUM:NORM:VAL?
:NUM:VAL "2020-02-14T11:43:08.565300+01:00",2.7941433E-3
```



# FETCH MEASUREMENT VALUES (ELOG SYSTEM)

Command	Description
:ELOG:ITEMS "AI 1/1 Sim"	Set ELOG Channel List to AI 1/1 Sim
:ELOG:PER 0.1	Set ELOG Buffer to 0.1s Resolution
:ELOG:CALC RMS	Set ELOG Aggregation to RMS
:ELOG:TIM ABS	Enable Timestamp at first Position (Absolute)
:ELOG:START	Start ELOG Buffering
:ELOG:FETCH?	Fetch values from the beginning until now
:ELOG:STOP	Stop Buffering
:ELOG:RESET	Reset all ELOG Settings

```

:ELOG:PER 0.1
:ELOG:CALC RMS
:ELOG:TIM ABS
:ELOG:START
:ELOG:FETCH?
:ELOG:FETC "2020-02-14T11:46:43.886000",2.794605E-3,"2020-02-14T11:46:43.986000"
,2.7948461E-3,"2020-02-14T11:46:44.086000",2.7995101E-3,"2020-02-14T11:46:44.186
000",2.7932862E-3,"2020-02-14T11:46:44.286000",2.8057591E-3,"2020-02-14T11:46:44
.386000",2.8020608E-3,"2020-02-14T11:46:44.486000",2.7963629E-3,"2020-02-14T11:4
6:44.586000",2.7948839E-3,"2020-02-14T11:46:44.686000",2.7998081E-3,"2020-02-14T
11:46:44.786000",2.803201E-3,"2020-02-14T11:46:44.886000",2.7998193E-3,"2020-02-
14T11:46:44.986000",2.7920389E-3,"2020-02-14T11:46:45.086000",2.7931231E-3,"2020
-02-14T11:46:45.186000",2.7955935E-3,"2020-02-14T11:46:45.286000",2.8039234E-3,"
2020-02-14T11:46:45.386000",2.7987496E-3,"2020-02-14T11:46:45.486000",2.7939583E
-3,"2020-02-14T11:46:45.586000",2.8005889E-3,"2020-02-14T11:46:45.686000",2.7978
561E-3,"2020-02-14T11:46:45.786000",2.7907853E-3,"2020-02-14T11:46:45.886000",2.
7967977E-3,"2020-02-14T11:46:45.986000",2.8031622E-3,"2020-02-14T11:46:46.086000
",2.8050889E-3,"2020-02-14T11:46:46.186000",2.8036708E-3,"2020-02-14T11:46:46.28
6000",2.8033283E-3,"2020-02-14T11:46:46.386000",2.8032076E-3,"2020-02-14T11:46:4
6.486000",2.8097096E-3,"2020-02-14T11:46:46.586000",2.8092446E-3,"2020-02-14T11:
46:46.686000",2.8084978E-3,"2020-02-14T11:46:46.786000",2.8072381E-3,"2020-02-14
T11:46:46.886000",2.8015217E-3,"2020-02-14T11:46:46.986000",2.7947189E-3,"2020-0
2-14T11:46:47.086000",2.8017857E-3,"2020-02-14T11:46:47.186000",2.7960716E-3,"20
20-02-14T11:46:47.286000",2.7952768E-3,"2020-02-14T11:46:47.386000",2.7936568E-3
,"2020-02-14T11:46:47.486000",2.7893306E-3,"2020-02-14T11:46:47.586000",2.790730
1E-3,"2020-02-14T11:46:47.686000",2.7971331E-3

:ELOG:STOP
:ELOG:RESET

```

# GET CHANNEL INFORMATION



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Command	Description
<code>:CHANNEL:NAMES?</code>	Get List of available channels, including Name and Channel ID
<code>:CHANNEL:PROP? "4899916385989165056", "Neon/LongName"</code>	Get Channel Name of Channel with ID 48999...
<code>:CHANNEL:PROP? "4899916385989165056", "Range"</code>	
<code>:CHANNEL:PROP? "4899916385989165056", "SampleRate"</code>	
<code>:CHANNEL:PROP? "4899916385989165056", "Unit"</code>	

```

:CHANNEL:NAMES?
:CHANNEL:NAM ("11796897740330369055", "AI 1/1 Sim"), ("11796897740330369056", "AI 1
/2@[RemoteNode]"), ("11796897740330369057", "AI 1/3@[RemoteNode]"), ("1179689774033
0369058", "AI 1/4@[RemoteNode]"), ("11796897740330369059", "CAN 1/1@[RemoteNode]"),
("11796897740330369060", "CAN 2/1@[RemoteNode]"), ("11796897740330369061", "CAN 2/2
@[RemoteNode]"), ("11796897740330369062", "CAN 2/3@[RemoteNode]"), ("11796897740330
369063", "CAN 2/4@[RemoteNode]")
:CHANNEL:PROP? "11796897740330369055"
:CHANNEL:PROP? "11796897740330369055"
:CHANNEL:PROP? "11796897740330369055", "Neon/LongName"
:CHANNEL:PROP "AI 1/1 Sim"
:CHANNEL:PROP? "11796897740330369055", "Range"
:CHANNEL:PROP (RANGE, -10.0, "V", 10.0, "V")
:CHANNEL:PROP? "11796897740330369055", "S
ampleRate"
:CHANNEL:PROP (SCALAR, 10000.0, "Hz")
:CHANNEL:PROP? "11796897740330369055", "Unit"
:CHANNEL:PROP "V"
    
```



# DATA STREAM

Command	Description
:DST:ITEMS "AI 1/1 Sim","U1_tRMS@POWER/0"	Set Data Stream Channel list to AI 1/1 Sim and U1_tRMS@POWER/0
:DST:PORT?	Get the TCP Port of the Stream
:DST:INIT	Initialize Stream
:DST:STAT?	Get Stream Status

Open new Console or Putty Session with "localhost" and Port 10003. There should appear a message: OXYGEN DATA STREAM PLUGIN V1.5

Use this Console only for viewing the data!  
Do not type in any commands!

:DST:START	Start Streaming
:DST:STOP	Stop Streaming

```
CAIRHIEN.dewetron.com - PuTTY
:DST:ITEMS "AI 1/1 Sim"
:DST:PORT?
:DST:PORT1 10003
          :DST:INIT
:DST:STAT?
:DST:STAT1 INITIALIZED
          DST:START
:DST:STOP
```

```
CAIRHIEN.dewetron.com - PuTTY
[Large block of garbled data and terminal output]
```