

THE MEASURABLE DIFFERENCE.



DEWETRON

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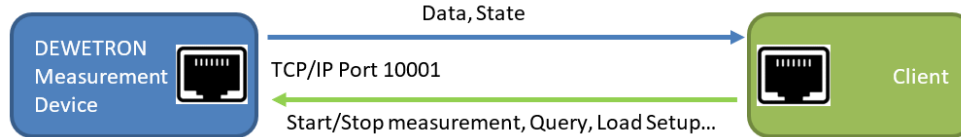
# OXYGEN TRAINING > SCPI





# 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        |



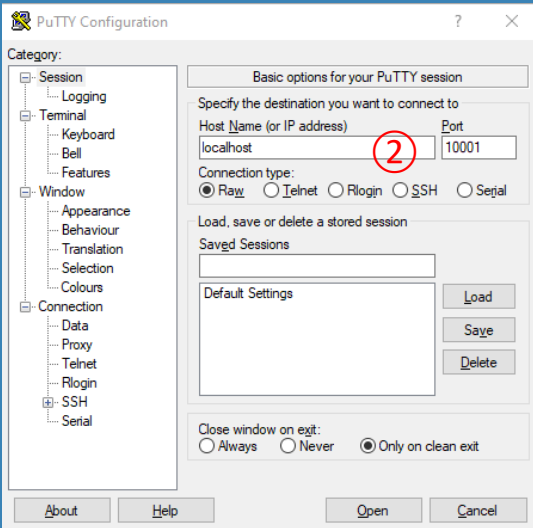
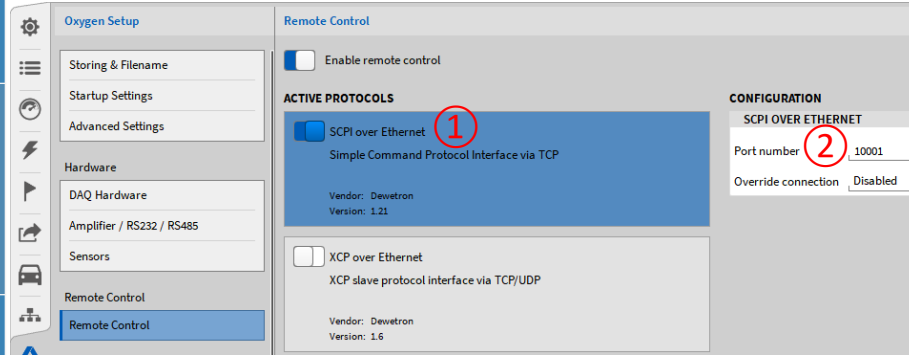
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# GETTING STARTED AND BASICS

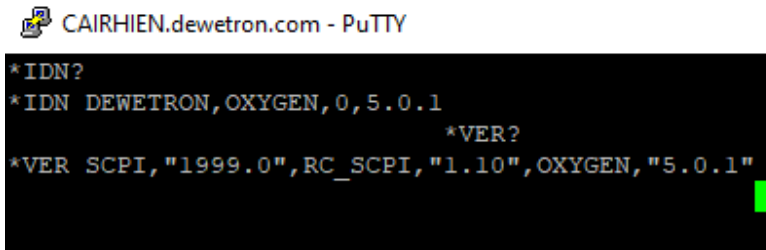
① Enable SCPI in Oxygen

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  |
|--|--|
| <code>:DST:ITEMS "AI 1/1 Sim","U1_tRMS@POWER/S@POWER/0"</code> | Set Data Stream Channel list to AI 1/1 Sim and U1_tRMS@POWER/0 |
| <code>:DST:PORT?</code>  | Get the TCP Port of the Stream                                 |
| <code>:DST:INIT</code>   | Initialize Stream  |
| <code>:DST:STAT?</code>  | 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!

|                         |                 |
|-------------------------|-----------------|
| <code>:DST:START</code> | Start Streaming |
| <code>:DST:STOP</code>  | 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
```

