

## **SmartLink™ Commands Tutorial**

### **Measurement Setup Process**

You can take quick measurements with your SmartLink™ right out of the box, using the instrument's default configurations and the :Meas? command.

For more complex measurements, you will want to use the three-step process outlined below to be certain you are getting measurement results that meet your needs.

Before you can take measurements or configure channels, you must already have established communication with the instrument. You configure the communications port on SmartLink™ using its Local Port and the :Config:Comm commands.

You should also set the instrument's internal time and date using the :Time and :Date commands at this time; although it is not mandatory.

Once you have established communication and set the time and date, you can complete the following tasks to ensure the measurement you make will give you the results you want.

- 1. Configure the SmartLink™ Instrument.**
- 2. Activate SmartLink™ Configurations.**
- 3. Activate the Measurement.**

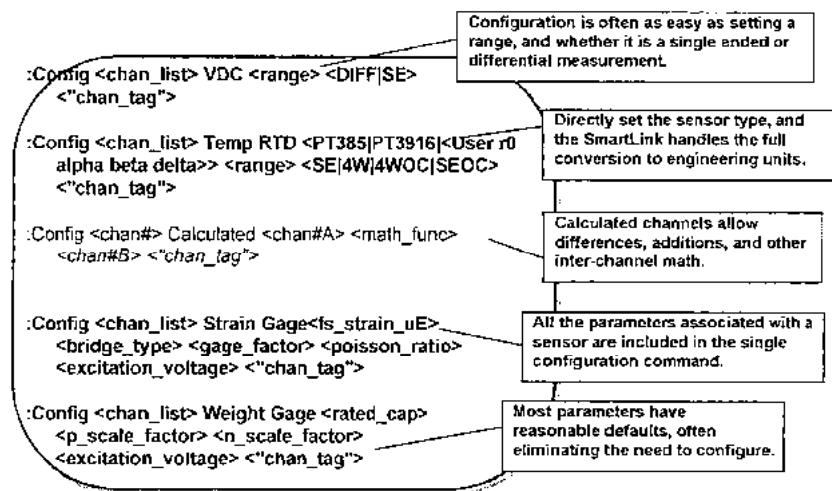
Keep in mind that you can take measurements with your SmartLink™ right out of the box, using the instrument's default configurations and the :Meas? command. You then only have to change those configurations that are necessary to meet your needs.

Please read the following sections in the order they appear to get the most benefit from this quick tutorial.

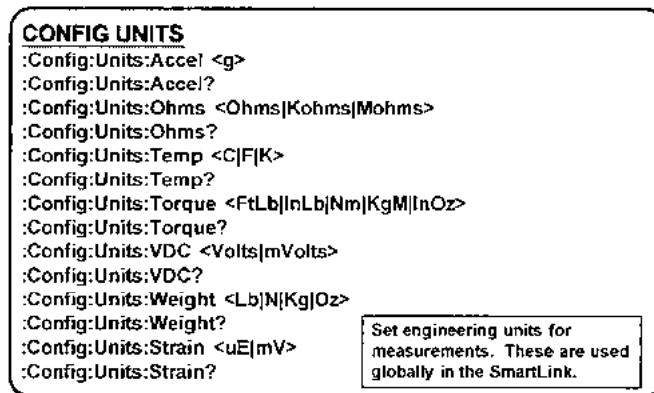
### *Configure the SmartLink™ Instrument*

#### CONFIGURE SMARTLINK™ CHANNELS

- 1 Configure channels to measure the correct parameters with an appropriate measurement style (e.g. DCVolts-differential, DCVolts-single ended, 4-wire ohms-offset compensated, etc.) using :Config <chan\_list> commands.



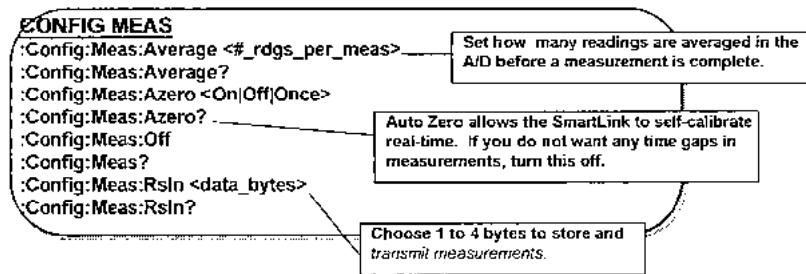
- 2 Configure units for each measurement parameter (e.g. FtLb for torque, K for temperature, etc.) using :Config:Units commands.



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### CONFIGURE SMARTLINK™ DATA CONDITIONING

- 1 Configure the instrument to average a number of readings for each measurement using :Config:Meas or :Config:Filter commands.



Since the digital filter is a moving average filter you get new readings at nearly the same rate as with unaveraged measurements.

**CONFIG FILTER**

```
:Config:Filter:Dig:MvgAvg <chan_list> <#_of_meas>
:Config:Filter:Dig:MvgAvg? <chan_list>
```

When using a Moving Average Digital Filter, it is important to note that the first "N" readings are not fully filtered. If they must be filtered, use the :config:meas:average command

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- 2 Configure the instrument to scale data from each reading using the :Config:Scaling commands.

**CONFIG SCALING**

```
:Config:Scaling <chan_list> <><span>&|<mb>&|<table>|<
:Config:Scaling? <chan_list>
:Config:Scaling:MB <chan_list> <m_value> <b_value>
:Config:Scaling:MB? <chan_list>
:Config:Scaling:Span <chan_list> <zero_value> <+span> <-span>
:Config:Scaling:Span? <chan_list>
:Config:Scaling:Units <chan_list> <"new_units">
:Config:Scaling:Units? <chan_list>
:Config:Scaling:Format <chan_list> <Default| Fixed #_digits_before> <#_digits_after>
:Config:Scaling:Format? <chan_list>
```

The | symbol indicates either/or

MB is useful for units conversion.

Zero/Span is useful for sensor calibration.

You can define your own new units to display or transmit

You can control the format of scaled data.

## CONFIGURE SMARTLINK™ LIMIT CONDITIONS

- 1 Configure the instrument so it will check measurement data to see if it falls within desired limits, and specify what action the instrument takes when data is outside these limits using the :Config:Limits commands.

**CONFIG LIMITS**

```
:Config:Limits <chan_list> <Lim1|Lim2> <High|Low> <lim_value> <hysteresis>
:Config:Limits? <chan_list> <Lim1|Lim2>
:Config:Limits:Assoc <digout_chan#> <chan_list> <Lim1|Lim2>
:Config:Limits:Assoc? <digout_chan#>
```

Two limits on every channel

Allow deadband to avoid ringing

Example:  
:Config:Limits:Assoc 17 1-5 Lim1  
Associate digital output channel 17 with Lim1 on channels 1 through 5

Associate limit or limits with digital outputs. If any channel is in limit, the Digout is set.

## **CONFIGURE SMARTLINK™ CHANNEL SCANNING & MEASUREMENT TIMING**

You can configure the instrument to measure a list of channels at a specific time, at regular intervals of time, or after a trigger condition occurs in two ways.

**Using the :Config:Meas:Trig command**

**Using the :Config:Scan command**

### **Using the :Config:Meas:Trig command**

If you want the instrument to take a single measurement under certain conditions you use the `:Config:Meas:Trig <Immediate|TrigIn|DigIn|<chan#>>` command to specify the conditions.

You must then issue the `:Meas? <chan_list> <#_of_rdgs>` command to cause the instrument to watch for those conditions and take the number of readings specified by `<#_of_rdgs>` from each of the channels specified in `<chan_list>`.

### Using the :Config:Scan command

You can configure the instrument to scan a set of channels at regular intervals of time or after a specified trigger condition occurs using the :Config:Scan commands.

You must first define the channels you wish to scan using the :Config:Scan <chan\_list> command and then define the conditions that will cause the scan to start using the :Config:Scan:Initiate command.

**Measure & Capture are special cases of Scan. Use Scan to get detail control over your measurement**

#### **Config SCAN**

```
:Config:Scan <chan_list>
:Config:Scan?
:Config:Scan:Interval <nn:mm:ss.ssssss>
:Config:Scan:Interval?
:Config:Scan:Initiate <Immediate | TrigIn
    <Either | Rising | Falling> <%_pretrigger>
    | Level <chan#> <level> <Hi|Lo> <%_pretrigger>>
:Config:Scan:Initiate?
:Config:Scan:Data <MemOnly | ProcessMem |
    MemProcessXmit | ProcessXmit | XmitOnly>
:Config:Scan:Data?
```

Start the scan now, or  
based on a hardware  
trigger, or based on the  
value of an input

**MemOnly:** Store to memory, then stop (Fast).

**ProcessMem:** Process to Engng units, then store to memory (slower).

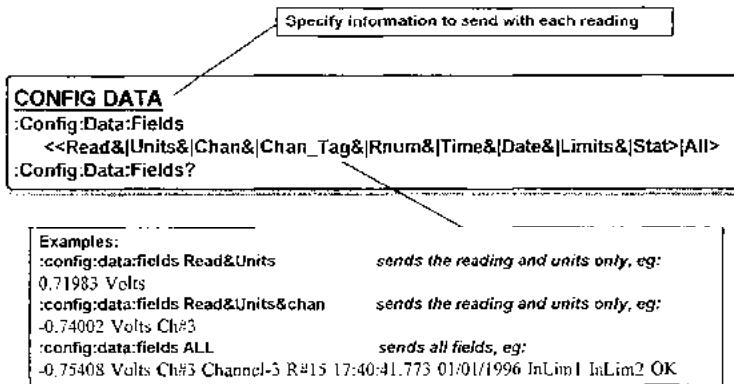
**MemProcesXmit:** Store to memory fast, then process and transmit later.

**ProcessXmit:** Process and transmit real-time (slower).

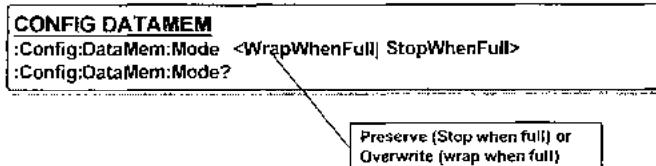
## SMARTLINK™ COMMANDS TUTORIAL

### CONFIGURE SMARTLINK™ DATA COLLECTION

- 1 Configure which data as well as which fields in the data will be transmitted to memory or to the display using the :Config:Data commands.



- 2 Configure the way data is stored and the format in which it will be stored using the :Config:DataMem commands.



*Activate SmartLink™ Configurations*

There are a number of configurations you set up with :Config commands that you must activate before SmartLink™ will use them.

**ACTIVATE FILTERING CONFIGURATIONS**

You activate filtering configurations for specified channels using the :Filter:Dig commands. You must activate filtering before you tell the instrument to take a measurement using the :Meas? Command.

**FILTER**

```
:Filter:Dig <chan_list><On|Off>
:Filter:Dig? <chan_list>
```

**ACTIVATE SCALING CONFIGURATIONS**

You activate scaling configurations for specified channels using the :Scaling command.

**SCALING**

```
:Scaling <chan_list> <On|Off>
:Scaling? <chan_list>
```

**ACTIVATE LIMITS CONFIGURATIONS**

You activate limits configurations for specified channels using the :Limits commands.

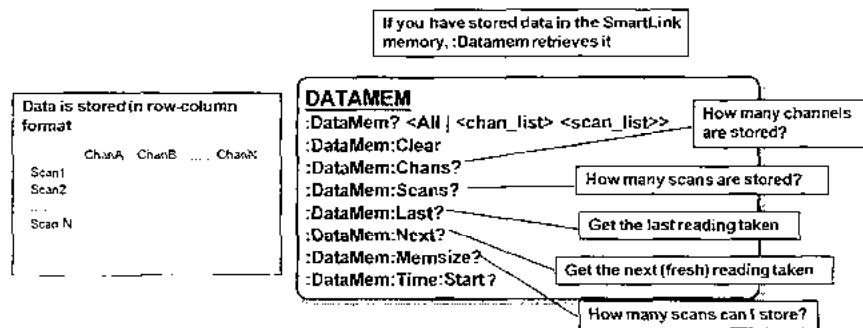
**LIMITS**

```
:Limits <<chan_list>>|All><On|Off>
:Limits? <chan_list>
:Limits:Status? <chan_list>
```

## SMARTLINK™ COMMANDS TUTORIAL

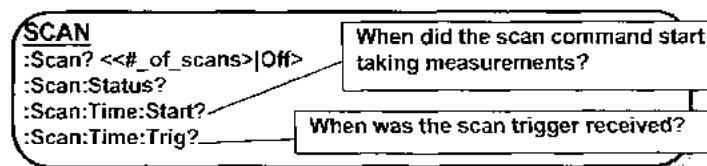
### ACTIVATE DATA STORAGE CONFIGURATIONS

You activate data storage configurations using the :DataMem commands.



### ACTIVATE SCAN CONFIGURATIONS

You activate Scan configurations using the :Scan commands.



*Activate the Measurement*

There are three ways to cause SmartLink™ to take a measurement.

**ISSUE THE :MEAS? COMMAND.**

A single command (Meas) for normal measurements,  
a single command (Capture) for high speed  
measurements.

**MEASURE**  
**:Meas? <chan\_list> <<#\_of\_rdgs>|Off>**

Channel lists have the same format as Excel  
row & columns... 1,2,5-7 is channels 1,2,5,6,7

**ISSUE THE :SCAN? COMMAND.**

**SCAN**  
**:Scan? <<#\_of\_scans>|Off>**

**ISSUE THE :CAPTURE? COMMAND.**

**MEASURE**  
**:Capture? <chan\_list> <#\_of\_rdgs|All> <Immediate|Level <chan#> <level> <Hi|Lo>>**  
**<interval\_usecs> <ASCII|Binary>**

Set the interval between start of scans. If the interval is shorter than  
the time it takes to complete the scan, it goes continuously.

Initiate now, based on the  
level of any channel

\*Note: All commands in Italics will be available in future firmware upgrades.