

Stream Device Lab

Kay Kasemir,
based on material from Eric Norum

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Start “Simple Instrument”

Start demo device:

```
cd /ics/examples/08_streamDemoApp/devices  
python simpleInstrument.py --verbose
```

Access from other terminal, then try all the commands listed on next page:

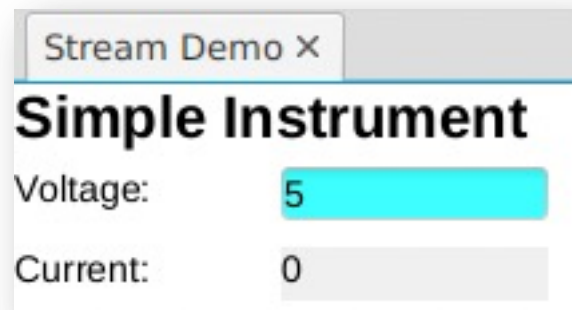
```
nc localhost 24742
```

Test Example Device Commands

*IDN?	Device Name (up to 100 chars long)
ON 0	Turn off
ON 1	Turn on
VOLTS 5.0	Set voltage, +-10V range
ON?	Returns off/on state
VOLTS?	Returns voltage setting
CURR?	Returns current, +-11A
LOAD?	Returns CPU load (1, 5, 15 minute average)

Study examples under /ics/examples

- Check 08_streamDemoApp/src/Makefile
 - Adds asyn & stream support to IOC
- Check 08_streamDemoApp/Db/si_stream.db, si.proto
 - Records and protocol for the Simple Instrument
- Check and run iocBoot/ioc_streamDemo/st_si.cmd
 - IOC startup file



- For display, use
08_streamDemoApp/opi/simpleInstrument.bob

Support all Simple Instrument Commands

- *IDN? - Display the device information
- ON 0/1 - Allow turning the device off/on
- ON? - Indicate the current device state
- LOAD? - Display the CPU load of the device

- Extend database and protocol file
- Add display

Hints

ON? Replies with "0" or "1"

Use BI record with protocol similar to `in "%d"`

Set records ZNAM and ONAM to show as "Off", "On" on display.

ON needs "0" or "1"

Use BO record with protocol similar to `out "%d"`

Again set records ZNAM and ONAM for display.

Hints

*IDN? Provides up to 100 chars

Use WAVEFORM record,
FTVL="CHAR", NELM=100,
with protocol based on `in "%#s"`

In display, use Text Update with Format: String.

Hints

LOAD? Replies with e.g. "0 0.01 0.05"

Use I/O Intr processing and value skipping (%*)

```
read_L1 { out "LOAD?"; in "%f %*f %*f"; }  
read_L2 { in "%*f %f %*f"; }
```

.. same for L3

```
record (ai, "SI:Load1")  
{  
  field (DTYP, "stream")  
  field (INP, "@si.proto read_L1 SI")  
  field (SCAN, "1 second")  
}
```

```
record (ai, "SI:Load2")  
{  
  field (DTYP, "stream")  
  field (INP, "@si.proto read_L2 SI")  
  field (SCAN, "I/O Intr")  
}
```

.. same for L3

Extra Points

- Your On/Off command should initialize by reading the current on/off state
- What happens when you read the “*IDN” with “%s” instead of “%#s”?
- Add units to current and voltage
- Display them with some decimals
- Add a record to compute power = voltage * current

Simple Instrument

Voltage: 5.20 V

Current: 5.18 A

Power: 26.92 W

State: On Off

ID: US-PAS Instrument, Yoyodyne Inc. -- An ACME Industries subsidiary, S/N:1313

Load: 0.08 0.12 0.08