OAK RIDGE National Laboratory

# Stream Device Lab

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based on material from Eric Norum

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# Start “Simple Instrument”

Start demo device:

```
cd /ics/examples/07_stream/devices
python3 simpleInstrument.py --verbose
```

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

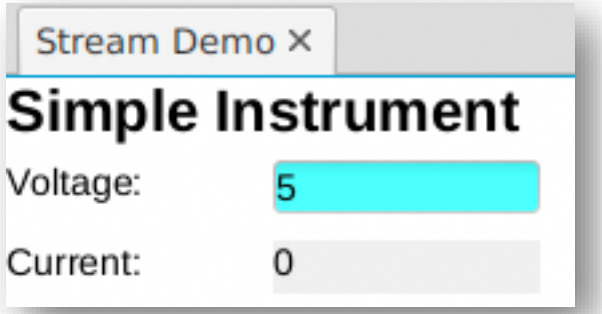
```
nc localhost 24742
```

# 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/07_stream

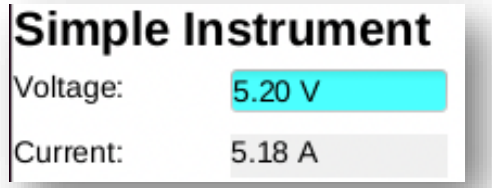
- Check demoApp/src/Makefile
  - Adds asyn & stream support to IOC
- Check demoApp/Db/si_stream.db, si.proto
  - Records and protocol for the Simple Instrument
- Check and run iocBoot/iocdemo/st_si.cmd
  - IOC startup file




- For display, use opi/simpleInstrument.bob

# Support all Simple Instrument Commands

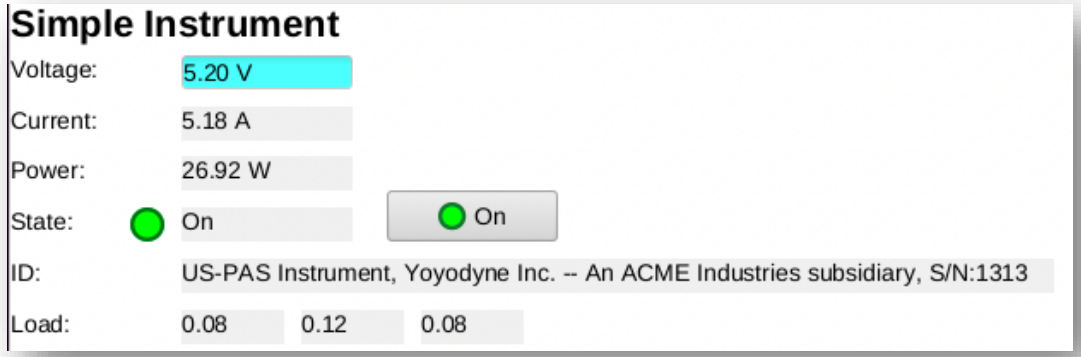
First, set units and increase the display precision.
Limit the voltage range to -10 .. +10 V.
Then add:




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

Required steps likely include:

- Extend database and protocol file
- 'make'
- Restart IOC
- Add to display



# Hints

## ON? replies with “ON 0” or “ON 1”

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

Set record fields ZNAM and ONAM to show as “Off”, “On” on display.

## ON command needs “ON 0” or “ON 1”

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

Again set 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

# More Ideas

- Add a record to compute power = voltage * current
- 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"?