OpenDCS Documentation

Release 0.4

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CHAPTER 1

Introduction

Dactl is an application for creating custom data acquisition and control systems under the GNOME desktop environment. At this time it is heavily dependent on the existence of a valid configuration, the details of which are entirely undocumented.

There is a companion library that dactl is pretty heavily reliant on and will be referenced to through the documentation, libcld. It has it's own (incomplete) documentation which can be viewed here.

This software is still in early stages of development

Sample Layout

Using this configuration file dactl will generate the view seen here.

Existing Features

- XML configurable UI classes for:
  - AI channel
  - AO channel
  - DI channel
  - DO channel
  - Log file (start/stop)
  - Strip chart
- UI for changing the properties of:
  - libcld channel types (AI/AO/DI/DO/Math)
  - libcld data series (incomplete)

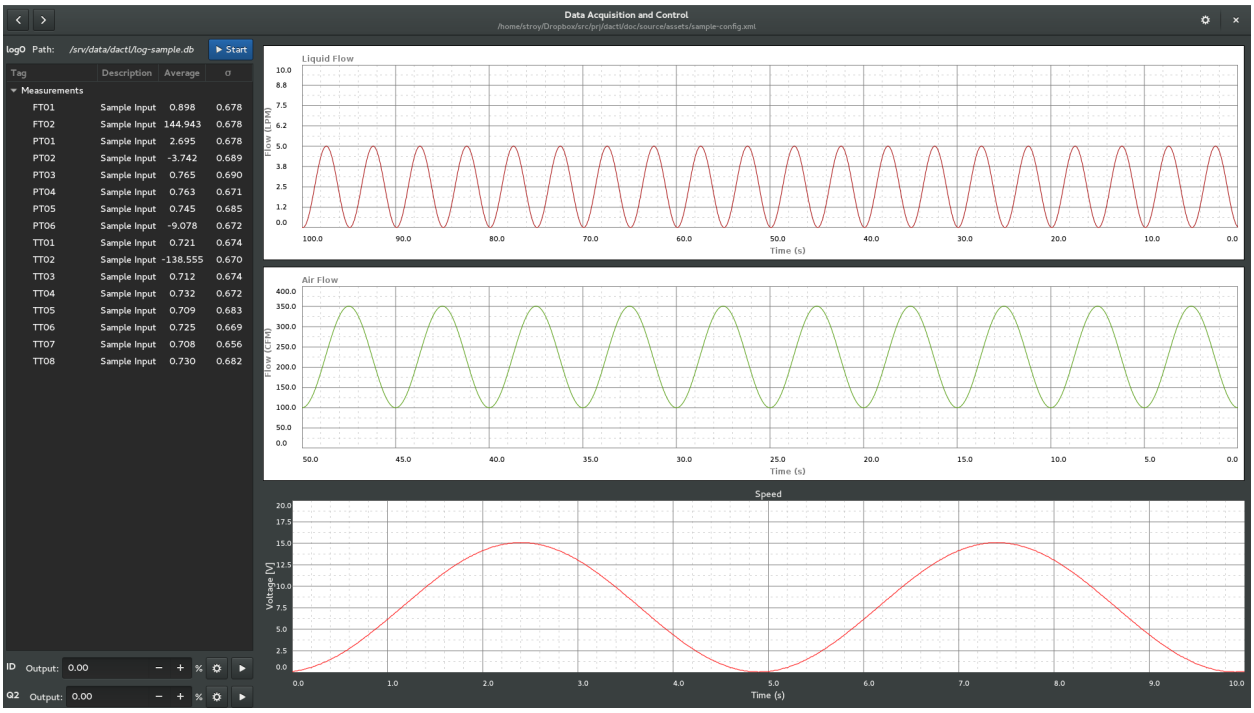


Fig. 1.1: A sample dactl layout configuration.

  - libcld channel calibrations
  - libcld logs
- A page to export logged database tables as CSV files
- Framework for custom plugins. See the *example plugin. <https://github.com/coanda/dactl-mcc-plugin>*

Planned Features

- Configuration-less mode
- DBus API for adding and configuring UI
- XML configurable UI classes for:
  - Recording video from OpenCV compatible cameras
  - Chart for viewing recorded history of measurement data
  - Data browser that connects to stored CSV and SQLite logs
- UI for changing the properties of:
  - General application settings
  - All dactl UI widgets
- Peas plugin loader
- Ability to tweak dactl UI widgets using Gtk properties of underlying classes

Other Things that are Present but Non-functional

- All plugins in src/plugins other than Velmex which is only partially complete
- A page to edit the configuration file using gtksourceview

CHAPTER 2

Installation

Requirements

- Linux is the only tested OS
- GNOME 3 is the only tested DE
- Vala

Building from Source

The source code is hosted on GitHub.

Pre-installation Setup

Install Fedora 19 .. 23 dependencies

```
sudo dnf install -y automake autoconf libtool gnome-common intltool gcc vala
sudo dnf install -y glib2-devel gtk3-devel libxml2-devel libgee-devel \
 json-glib-devel clutter-devel clutter-gtk-devel gsl-devel gtksourceview3-devel \
 libmatheval-devel sqlite-devel gobject-introspection-devel gettext-devel \
 gettext-common-devel libmodbus-devel comedilib-devel librsvg2-devel \
 python3-devel pygobject3-devel
```

Install Ubuntu 14.04 dependencies

Notice: These commands have only been tested as part of a Travis-CI build.

```
sudo add-apt-repository ppa:vala-team/ppa -y
sudo apt-get update -qq
sudo apt-get install -qq gnome-common libglib2.0-dev libjson-glib-dev \
 libgee-0.8-dev libvala-0.22-dev libgsl0-dev libsqlite0-dev libxml2-dev \
 libmatheval-dev libmodbus-dev libcomedi-dev valac-0.22 librsvg2-dev \
 libgirepository1.0-dev libgtk-3-dev libclutter-1.0-dev libclutter-gtk-1.0-dev \
 python3-dev python-gobject-dev
```

Compiled Dependencies

Install Vala dependencies

```
git clone https://github.com/geoffjay/modbus-vapi.git
git clone https://github.com/geoffjay/comedi-vapi.git
sudo mkdir -p /usr/local/lib/pkgconfig
sudo cp comedi-vapi/comedi.pc /usr/local/lib/pkgconfig/
ver=`vala --version | sed -e 's/.*\([0-9]\.[0-9][0-9]\).*/\1/'`
sudo cp comedi-vapi/comedi.vapi /usr/share/vala-$ver/vapi/
sudo cp modbus-vapi/libmodbus.vapi /usr/share/vala-$ver/vapi/
```

Install libcld

```
git clone https://github.com/geoffjay/libcld.git
cd libcld
git checkout v0.3.1
export PKG_CONFIG_PATH=/usr/local/lib/pkgconfig
./autogen.sh
make && sudo make install
cd ..
echo "/usr/local/lib" | sudo tee --append /etc/ld.so.conf
sudo ldconfig
```

Compile and Install dactl

Warning: Installation overwrites the configuration file at *$(sysconfdir)/dactl/*, if an alternate value wasn't provided for *–prefix* than this is probably */usr/local/etc/dactl*. It's recommended that the existing configuration is copied over *data/config/dactl.xml* or backed up and dealt with separately.

```
git clone https://github.com/coanda/dactl.git
cd dactl
export PKG_CONFIG_PATH=/usr/local/lib/pkgconfig
./autogen.sh
make && sudo make install
```

Post-installation Configuration

The make install command given previously will overwrite the site-wide configuration, to fix the ownership settings you may need to do something along the lines:

```
chown -R `whoami`.$(id -gn `whoami`) /usr/local/etc/dactl
chmod -R g+w /usr/local/etc/dactl
chmod +x /usr/local/share/applications/dactl.desktop
```

Optional but Useful

Currently the only drivers tested for data acquisition hardware are comedi. You might be able to do something in dactl without comedi, but probably not. Some distributions (Ubuntu?) have support for comedi built into the kernel provided, but not Fedora. The instructions that we use for compiling comedi using dkms are

```
su -
dnf install -y automake autoconf libtool git dkms kernel-devel kernel-headers
git clone git://comedi.org/git/comedi/comedi.git
cp -R comedi/ /usr/src/comedi-0.7.76+20120626git-1.nodist
cd /usr/src/
dkms add -m comedi -v 0.7.76+20120626git-1.nodist
cd comedi-0.7.76+20120626git-1.nodist && ./autogen.sh && cd ..
dkms build -m comedi -v 0.7.76+20120626git-1.nodist
dkms install -m comedi -v 0.7.76+20120626git-1.nodist
echo "KERNEL==\"comedi*\", MODE=\"0666\", GROUP=\"iocard\"" > /etc/udev/rules.d/95-
↪comedi.rules
```

After these steps if you have a comedi compatible device you should be able to *modprobe comedi* as well as that for the device and it should show up in */dev*. If not, a test device can be created by:

```
su -
dnf install -y comedilib comedilib-devel
modprobe comedi comedi_num_legacy_minors=4
modprobe comedi_test
comedi_config /dev/comedi0 comedi_test
```

However, test devices are of limited use, they allow for instructions only on with no support[1] for commands.

[1] At least not that I'm aware of.

CHAPTER 3

Configuration

A collection of user interface elements are available. Configuration refers here to the XML code that defines the individual elements. Included in the collection are the box and page and thus a layout is created by recursively packing elements into boxes which are in turn packed into pages.

Analog Input Control

This control displays the current value along with statistical data.

This section shows how to add ann analog input control to a configuration file.

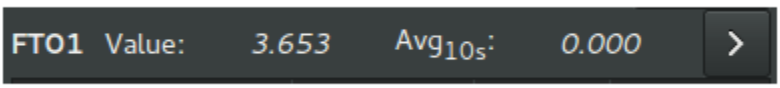
```
<ui:object id="ai-ctl0" type="ai" ref="/daqctl0/dev0/ai00"/>
```

Table of Configurable Attributes

attribute	default value
id	ai-ctl0
ref	null

This class contains no configurable properties.

The Analog Input Control as it appears when added to the interface:



Analog Output Control

This control facilitates

```
<ui:object id="ao-ctl0" type="ao" ref="/daqctl0/dev0/ao00"/>
```

Table of Configurable Attributes

attribute	default value
id	ao-ctl0
ref	null

This class contains no configurable properties.

Box

This section shows how to add a box to a configuration file. A Dactl Box inherits properties of a Gtk Box. It is simply a container for a user interface element or another box.

```
<ui:object id="box0" type="box">
  <ui:property name="homogeneous">true</ui:property>
  <ui:property name="orientation">horizontal</ui:property>
  <ui:property name="expand">true</ui:property>
  <ui:property name="fill">true</ui:property>
  <ui:property name="spacing">0</ui:property>
  <ui:property name="margin-top">0</ui:property>
  <ui:property name="margin-right">0</ui:property>
  <ui:property name="margin-bottom">0</ui:property>
  <ui:property name="margin-left">0</ui:property>
  <ui:property name="hexpand">true</ui:property>
  <ui:property name="vexpand">true</ui:property>
  <!--
     - Can contain <ui:object> elements of type:
     -
     -   * "ai":         Dactl.AIControl
     -   * "ao":         Dactl.AOControl
     -   * "box":        Dactl.Box
     -   * "tree":       Dactl.ChannelTreeView
     -   * "chart":      Dactl.Chart
     -   * "stripchart": Dactl.StripChart
     -   * "rt-chart":   Dactl.RTChart
     -   * "polarchart": Dactl.PolarChart
     -   * "pnid":       Dactl.Pnid
     -   * "pid":        Dactl.PidControl
     -   * "exec":       Dactl.ExecControl
     -   * "log":        Dactl.LogControl
     -   * "video":      Dactl.VideoProcessor
     -->
</ui:object>
```

Table of Configurable Attributes

attribute	default value
id	null
name	null

Table of Configurable Properties

property	data type	default value
homogeneous	bool	null
orientation	string	null
expand	bool	null
fill	bool	null
spacing	int	null
margin-top	int	null
margin-right	int	null
margin-bottom	int	null
margin-left	int	null
hexpand	bool	null
vexpand	bool	null

Channel Treeview

This section shows how to add a channel treeview to a configuration file. The columns of the treeview will appear in the same order as the configuration file. Channels can be put in to groups that can expand or collapse when the category name is activated.

```
<ui:object id="tree0" type="tree">
  <ui:property name="width-request">width-re</ui:property>
  <ui:property name="show-header">true</ui:property>
  <ui:property name="expand">true</ui:property>
  <ui:property name="fill">true</ui:property>
  <ui:property name="show-tag">true</ui:property>
  <ui:property name="show-desc">true</ui:property>
  <ui:property name="show-sample-sdev">true</ui:property>
  <ui:property name="show-sample-size">true</ui:property>
  <ui:property name="show-units">true</ui:property>
  <!--
     - Can contain <ui:object> elements of type:
     -
     -   * "tree-category": Dactl.ChannelTreeCategory
     -   * "tree-entry":    Dactl.ChannelTreeEntry
     -->
</ui:object>
```

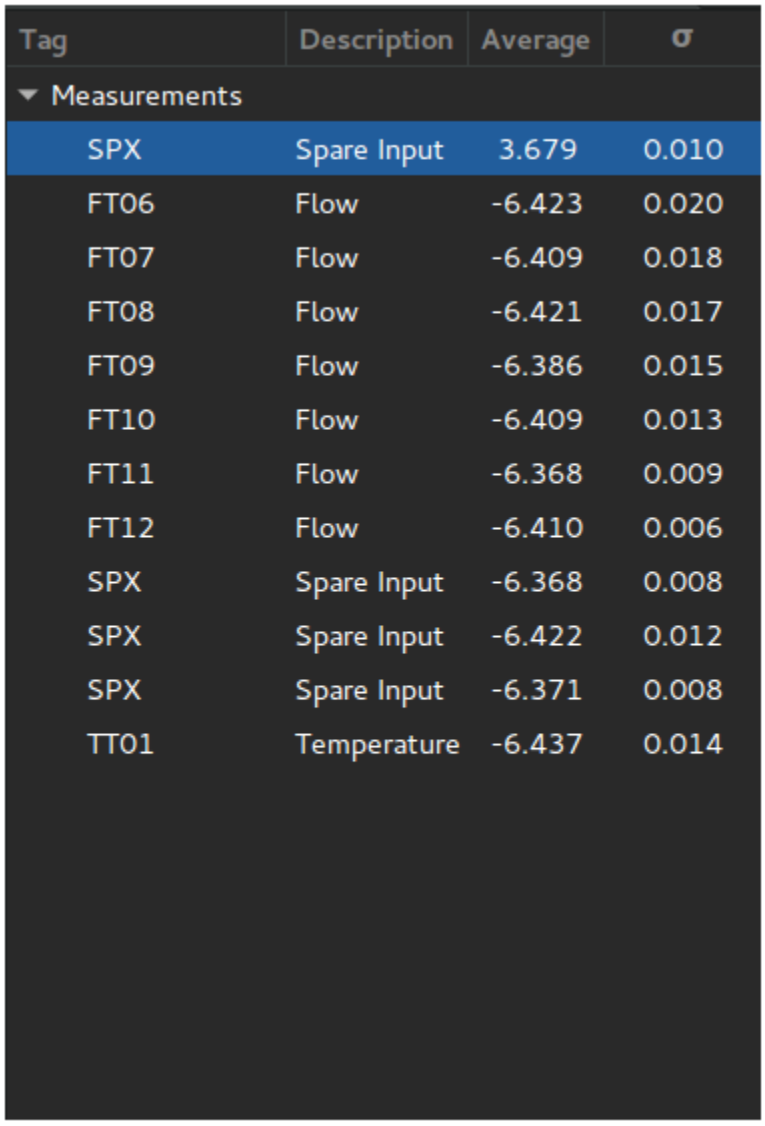
Table of Configurable Attributes

attribute	default value
id	null
chref	null

Table of Configurable Properties

property	data type	default value
width-request	int	null
show-header	bool	null
expand	bool	null
fill	bool	null
show-tag	bool	null
show-desc	bool	null
show-sample-sdev	bool	null
show-sample-size	bool	null
show-units	bool	null

The Channel Treeview Control as it appears when added to the interface:



Channel Tree Entry

This section shows how to add a channel tree entry to a configuration file.

```
<ui:object id="entry0" type="tree-entry" chref="/daqctl0/dev0/ai00"/>
```

Table of Configurable Attributes

attribute	default value
id	null
chref	null

Channel Tree Category

This section shows how to add a channel tree category to a configuration file.

```
<ui:object id="cat0" type="tree-category"/>
  <ui:property name="title">Title</ui:property>
  <!--
     - Can contain <ui:object> elements of type:
     -
     -   * "tree-category": Dactl.ChannelTreeCategory
     -   * "tree-entry":    Dactl.ChannelTreeEntry
     -->
</ui:object>
```

Table of Configurable Attributes

attribute	default value
id	null

Table of Configurable Properties

property	data type	default value
title	string	null

Command Execution Control

This section shows how to add a control that executes the given command to a configuration file.

```
<ui:object id="exec-ctl0" type="exec"/>
```

Table of Configurable Attributes

attribute	default value
id	null

This class contains no configurable properties.

Log Control

This section shows how to add a log control to a configuration file.

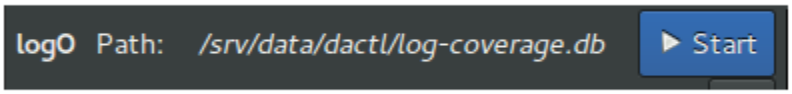
```
<ui:object id="log-ctl0" type="log" ref="/logctl0/log0"/>
```

Table of Configurable Attributes

attribute	default value
id	null
ref	null

This class contains no configurable properties.

The Log Control as it appears when added to the interface:



Page

This section shows how to add a page to a configuration file.

```
<ui:object id="pg0" type="page">
  <ui:property name="index">0</ui:property>
  <ui:property name="title">Title</ui:property>
  <ui:property name="expand">true</ui:property>
  <ui:property name="fill">true</ui:property>
  <ui:property name="visible">true</ui:property>
  <!--
     - Can contain <ui:object> elements of type:
     -
     -  * "box":  Dactl.Box
     -->
</ui:object>
```

Table of Configurable Attributes

attribute	default value
id	null

Table of Configurable Properties

property	data type	default value
index	int	null
title	string	null
expand	bool	null
fill	bool	null
visible	bool	null

PID Control

This section shows how to add a pid control to a configurtion file.

```
<ui:object id="pid-ctl0" type="pid" ref="/atmctl0/pid0"/>
```

Table of Configurable Attributes

attribute	default value
id	null
ref	null

This class contains no configurable properties.

The PID Control as it appears when added to the interface:

Plugin Control

This section shows how to add a plugin control to a configuration file.

```
<ui:object id="plugin-ctl0" type="plugin-control" parent="box0">
  <!-- Can contain references to the CLD tree, eg. -->
  <ui:property name="ref">/daqctl/dev0/ao00</ui:property>
</ui:object>
```

Table of Configurable Attributes

attribute	default value
null	null

Table of Configurable Properties

property	data type	default value
ref	string	null

PNID Control

This section shows how to add a pnid to a configuration file.

```
<ui:object id="pnid0" type="pnid">
  <ui:property name="image-file">image-file.svg</ui:property>
  <ui:property name="expand">true</ui:property>
  <ui:property name="fill">true</ui:property>
  <ui:property name="timeout">1000</ui:property>
  <!--
     - Can contain <ui:object> elements of type:
     -
     -   * "pnid-text": Dactl.PnidElement
     -->
</ui:object>
```

Table of Configurable Attributes

attribute	default value
id	null

Table of Configurable Properties

property	data type	default value
image-file	string	null
expand	bool	null
fill	bool	null
timeout	int	null

PnidElement

This section shows how to add a PNID to a configuration file.

```
<ui:object id="element0" type="element">
  <ui:property name="cld-ref">cld-ref</ui:property>
  <ui:property name="svg-ref">svg-ref</ui:property>
</ui:object>
```

Table of Configurable Attributes

attribute	default value
id	null
cld-ref	null
svg-ref	null

Table of Configurable Properties

property	data type	default value
cld-ref	string	null
svg-ref	string	null

Chart

This secion shows how to add a chart to a configuration file.

```
<ui:object id="chart0" type="chart">
  <ui:property name="title">Title</ui:property>
  <ui:property name="expand">true</ui:property>
  <ui:property name="fill">true</ui:property>
  <ui:property name="height-min">0</ui:property>
  <ui:property name="weight-min">0</ui:property>
  <ui:property name="show-title">true</ui:property>
  <ui:property name="show-grid">true</ui:property>
  <ui:property name="show-grid-border">true</ui:property>
  <!--
     - Can contain <ui:object> elements of type:
     -
     -   * "chart-axis": Dactl.Axis
     -->
</ui:object>
```

Table of Configurable Attributes

attribute	default value
id	null

Table of Configurable Properties

property	data type	default value
title	string	null
expand	bool	null
fill	bool	null
height-min	int	null
width-min	int	null
show-title	bool	null
show-grid	bool	null
show-grid-border	bool	null

Chart Axis

This section shows how to add a chart axis to a configuration file.

```
<ui:object id="ax0" type="chart-axis">
  <ui:property name="label">true</ui:property>
  <ui:property name="orientation">horizontal</ui:property>
  <ui:property name="min">true</ui:property>
  <ui:property name="max">true</ui:property>
  <ui:property name="div-major">0</ui:property>
  <ui:property name="div-minor">0</ui:property>
  <ui:property name="show-label">true</ui:property>
  <ui:property name="show-minor-ticks">true</ui:property>
  <ui:property name="show-major-ticks">true</ui:property>
  <ui:property name="show-minor-labels">true</ui:property>
  <ui:property name="show-major-labels">true</ui:property>
  <ui:property name="show-start-label">true</ui:property>
  <ui:property name="show-end-label">true</ui:property>
  <ui:property name="rotate-label">true</ui:property>
</ui:object>
```

Table of Configurable Attributes

attribute	default value
id	null

Table of Configurable Properties

property	data type	default value
label	bool	null
orientation	string	null
min	bool	null
max	bool	null
div-major	int	null
div-minor	int	null
show-labe	bool	null
show-minor-ticks	bool	null
show-major-ticks	bool	null
show-minor-labels	bool	null
show-major-labels	bool	null
show-start-label	bool	null
show-end-label	bool	null
rotate-label	bool	null

Real Time Chart

This secion shows how to add a real time chart to a configuration file.

```
<ui:object id="chart2" type="rt-chart">
  <ui:property name="title">Speed</ui:property>
  <ui:property name="height-min">100</ui:property>
  <ui:property name="width-min">100</ui:property>
  <ui:property name="refresh-ms">33</ui:property>
  <ui:property name="show-grid">true</ui:property>
  <ui:property name="show-grid-border">true</ui:property>
  <ui:property name="show-title">true</ui:property>
  <ui:property name="reverse-x-axis">false</ui:property>
  <ui:property name="show-x-axis-label">true</ui:property>
  <ui:property name="rotate-x-axis-label">false</ui:property>
  <ui:property name="show-y-axis-label">true</ui:property>
  <ui:property name="rotate-y-axis-label">true</ui:property>
  <!--
     - Can contain <ui:object> elements of type:
     -
     -   * "chart-axis":  Dactl.Axis
     -   * "rt-chart-trace": Dactl.Trace
     -->
</ui:object>
```

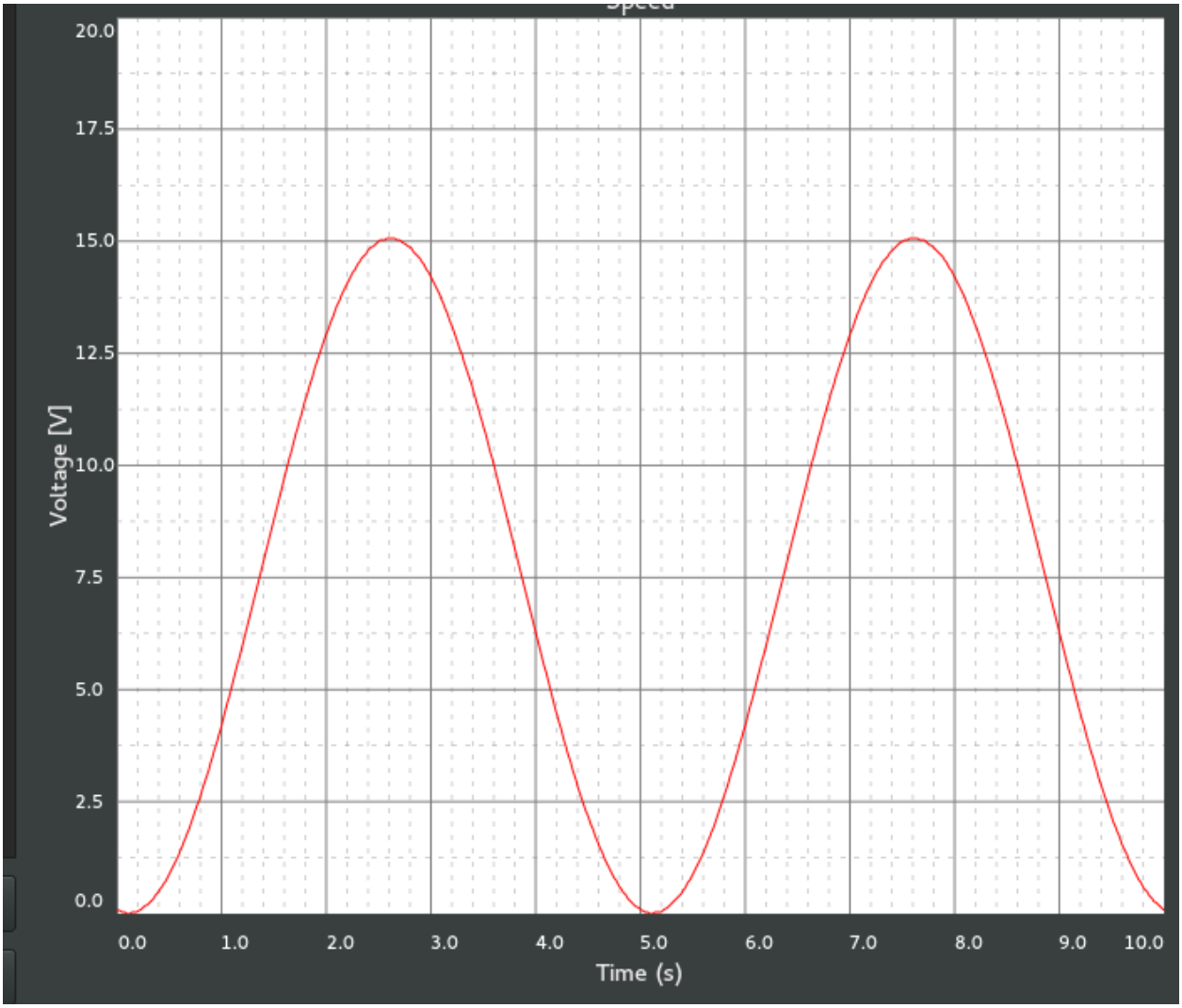
Table of Configurable Attributes

attribute	default value
id	null

Table of Configurable Properties

property	data type	default value
title	string	null
expand	bool	null
fill	bool	null
height-min	int	null
width-min	int	null
show-title	bool	null
show-grid	bool	null
show-grid-border	bool	null
refresh-ms	int	33

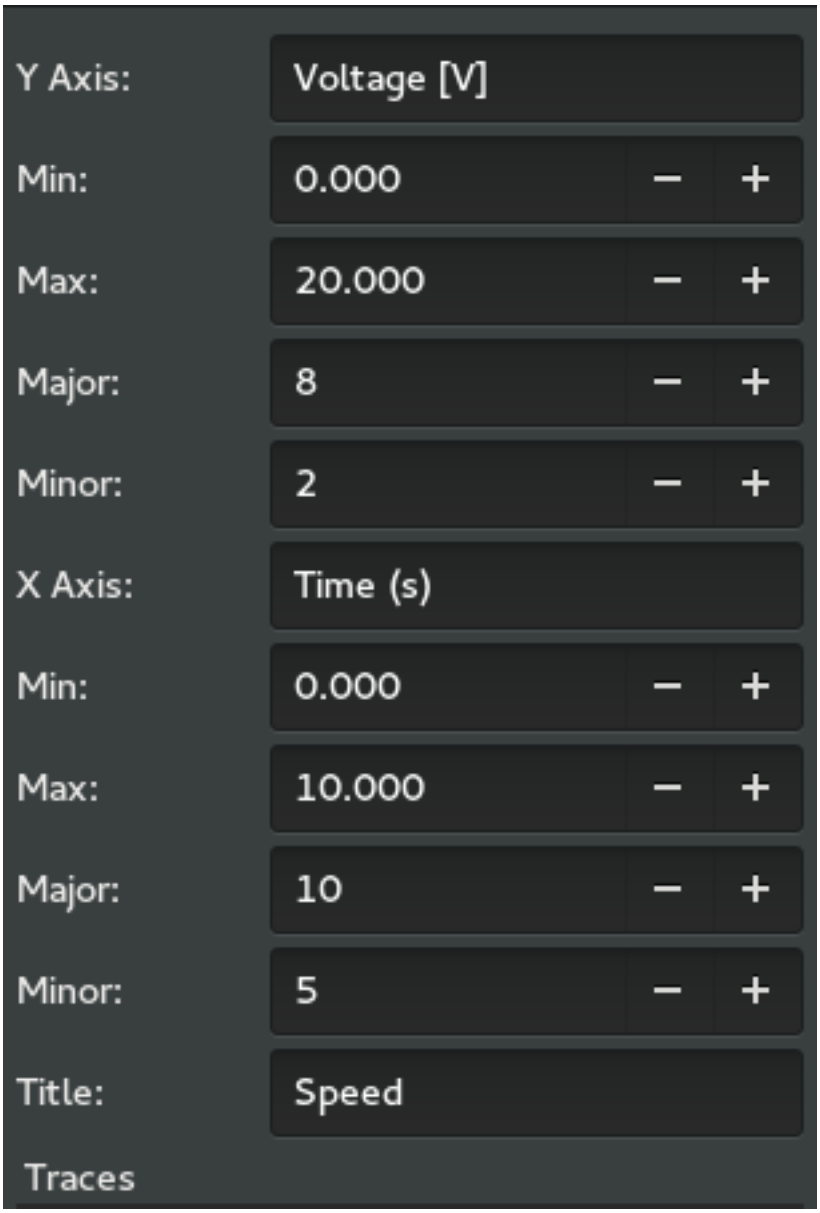
The real time chart as it appears when added to the interface:



Double clicking the chart reveals basic configuraton options:

Real Time Chart Trace

This section shows how to add a real time chart trace to a configuration file.


Y Axis:
Voltage [V]
Min:
0.000
Max:
20.000
Major:
8
Minor:
2
X Axis:
Time (s)
Min:
0.000
Max:
10.000
Major:
10
Minor:
5
Title:
Speed
Traces

```
<ui:object id="tr0-0" type="trace" ttype="real-time">
  <ui:property name="color">rgb(255,0,0)</ui:property>
  <ui:property name="line-weight">1</ui:property>
  <ui:property name="draw-type">line</ui:property>
  <ui:property name="points">1000</ui:property>
  <!--
     - Can contain <ui:object> elements of type:
     -
     -  * "dataseries":  Dactl.DataSeries
     -->
</ui:object>
```

Table of Configurable Attributes

attribute	default value
id	null

Table of Configurable Properties

property	data type	default value
points	int	null
draw-type	Dactl.TraceDrawType	null
line-weight	double	null
color	string	null

Data Series

A data series is a buffer that can be used to hold trace data.

This section shows how to add a data series to the configuration file.

```
<ui:object id="ds0-0" type="dataseries" ref="/daqctl0/dev0/ai02">
  <ui:property name="buffer-size">1000</ui:property>
  <ui:property name="stride">1</ui:property>
</ui:object>
```

Table of Configurable Attributes

attribute	default value
id	null
ref	null

Table of Configurable Properties

property	data type	default value
buffer-size	int	null
stride	int	null

Real Time Multi-Channel Chart Trace

This trace type can display data from several channels in a single trace.

This section shows how to add a real time chart trace to a configuration file.

```
<ui:object id="pg1chart0tr0" type="trace" ttype="multichannel">
  <ui:property name="color">#ce5c00</ui:property>
  <ui:property name="line-weight">1</ui:property>
  <ui:property name="draw-type">line</ui:property>
  <!--
     - Can contain <ui:object> elements of type:
     -
     -  * "channel-vector":  Dactl.ChannelVector
     -->
</ui:object>
```

Table of Configurable Attributes

attribute	default value
id	null
ref	null

Table of Configurable Properties

property	data type	default value
draw-type	Dactl.TraceDrawType	null
line-weight	double	null
color	string	null

Stripchart

This is the legacy strip chart. The settings user interface for this was in need of improvement and so it was replaced by the real time chart. It is has been retained in the library because it has some advantages over the newer chart type. Because it traces do not interpolate the data, they look much better with noisy data than the newer real time chart trace.

This section shows how to add a stripchart to a configuration file.

```
<ui:object id="chart0" type="stripchart">
  <ui:property name="title">Title</ui:property>
  <ui:property name="expand">true</ui:property>
  <ui:property name="fill">true</ui:property>
  <ui:property name="height-min">0</ui:property>
  <ui:property name="width-min">0</ui:property>
  <ui:property name="show-title">true</ui:property>
  <ui:property name="show-grid">true</ui:property>
  <ui:property name="show-grid-border">true</ui:property>
  <ui:property name="points-per-second">10</ui:property>
  <!--
     - Can contain <ui:object> elements of type:
     -
     -  * "chart-axis":  Dactl.Axis
     -  * "stripchart-trace": Dactl.Trace
     -->
</ui:object>
```

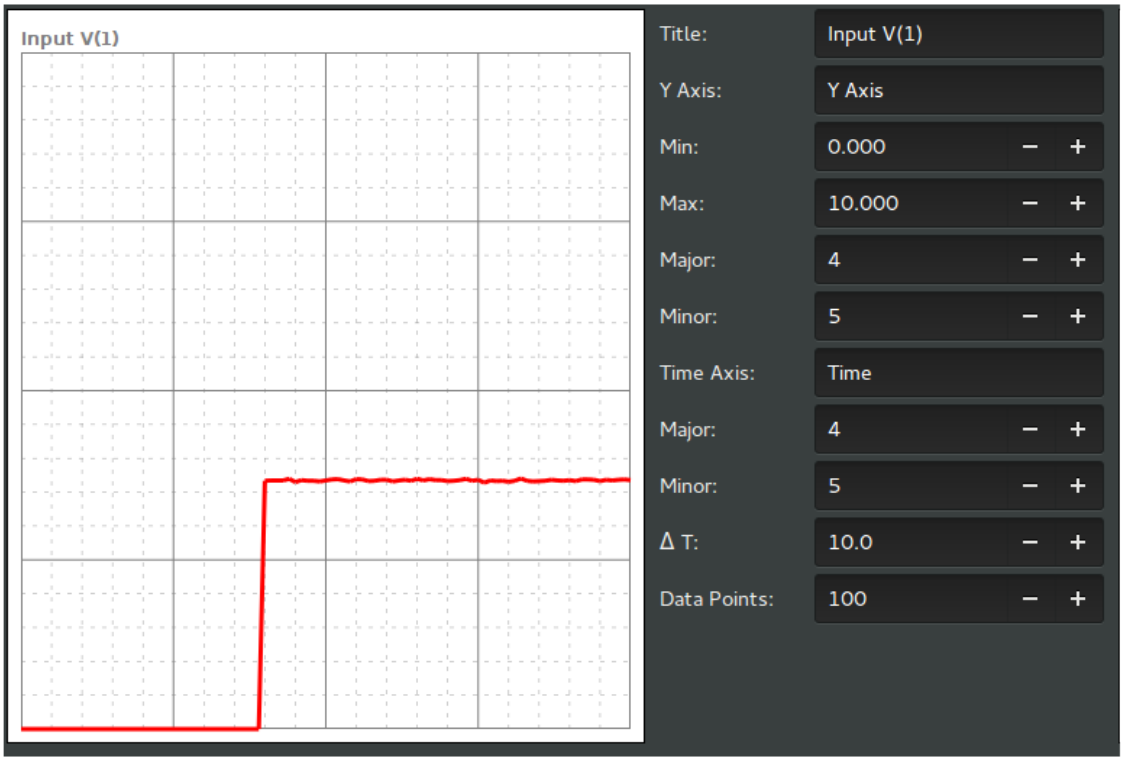
Table of Configurable Attributes

attribute	default value
id	null

Table of Configurable Properties

property	data type	default value
title	string	null
expand	bool	null
fill	bool	null
height-min	int	null
width-min	int	null
show-title	bool	null
show-grid	bool	null
show-grid-border	bool	null
points-per-second	int	null

The Stripchart as it appears when added to the interface:



Double clicking the chart reveals basic configuraton options:

assets/striphart-settings.png

Stripchart Trace

This is the legacy stripchart trace that is used with the strip chart.

This secion shows how to add a stripchart trace to a configuration file.

```
<ui:object id="tr0" type="stripchart-trace" ref="/daqctl0/dev0/ai00">
  <ui:property name="buffer-size">100</ui:property>
  <ui:property name="color">rgba(164,0,0,1.0)</ui:property>
  <ui:property name="line-weight">1.0</ui:property>
  <ui:property name="draw-type">line</ui:property>
  <ui:property name="window-size">500</ui:property>
  <ui:property name="stride">2</ui:property>
</ui:object>
```

Table of Configurable Attributes

attribute	default value
id	null
ref	null

Table of Configurable Properties

property	data type	default value
buffer-size	int	null
draw-type	Dactl.TraceDrawType	null
line-weight	double	null
color	string	null
stride	int	null
window-size	int	null
duration	string	null

Polar Chart

The polar chart is a surface for plotting polar data. To be complete it requires additional polar axes and a source of data. Currently, a heatmap is the only available drawable data source that can be displayed but trace data may be added in a future release.

```
<ui:object id="pg1chart0" type="polar-chart">
  <ui:property name="title">Bin Heat Map</ui:property>
  <ui:property name="refresh-ms">30</ui:property>
  <ui:property name="height-min">100</ui:property>
  <ui:property name="width-min">100</ui:property>
  <ui:property name="show-grid">true</ui:property>
  <ui:property name="show-grid-border">true</ui:property>
  <ui:property name="show-title">true</ui:property>
  <ui:property name="zoom">0.9</ui:property>
  <!--
     - Can contain <ui:object> elements of type:
     -
     -   * "chart-axis": Dactl.Axis
     -   * "colormap" Dactl.ColorMap
```

```
    -->
</ui:object>
```

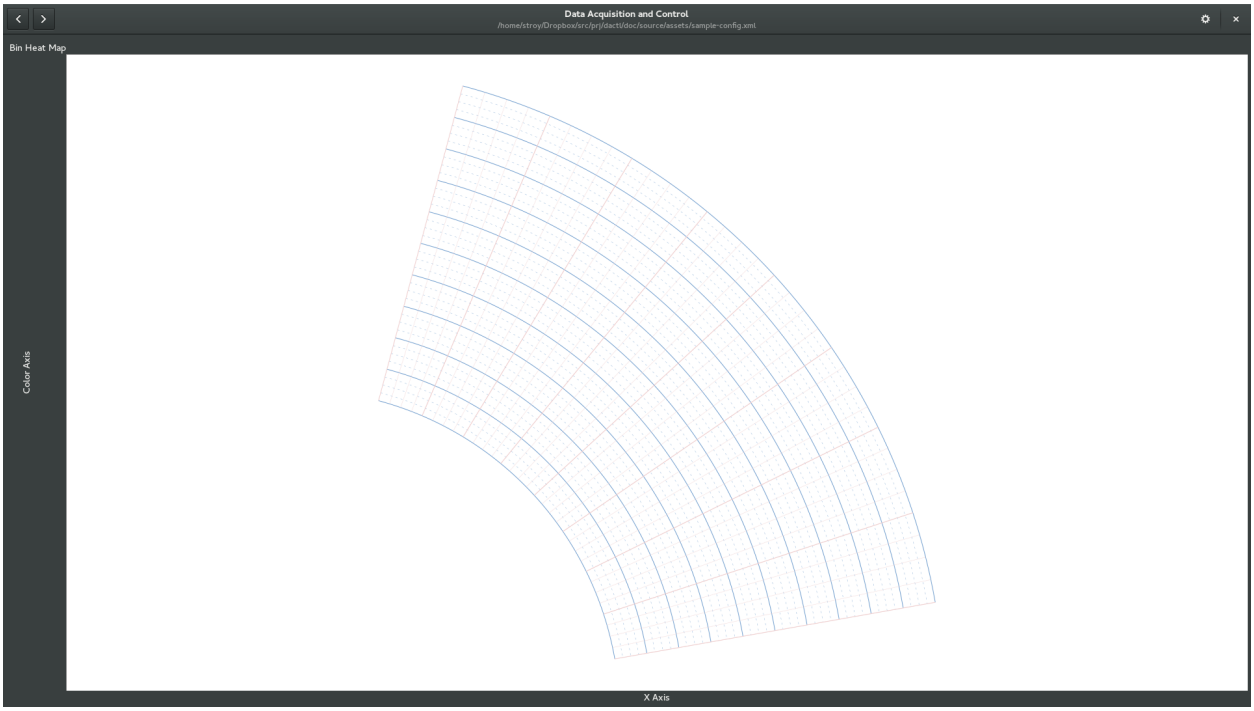
Table of Configurable Attributes

attribute	default value
id	null

Table of Configurable Properties

property	data type	default value
title	string	null
expand	bool	null
fill	bool	null
height-min	int	null
width-min	int	null
refresh-ms	int	33
zoom	double	0.8
show-title	bool	null
show-grid	bool	null
show-grid-border	bool	null

A polar chart with defined axes but no data.



Polar Chart Axis

This section shows how to add a polar chart axis to a configuration file.

```
<ui:object id="ax0" type="polar-chart-axis">
  <ui:property name="label">Angle [deg]</ui:property>
```

```
  <ui:property name="polar-axis-type">angle</ui:property>
  <ui:property name="min">10</ui:property>
  <ui:property name="max">75</ui:property>
  <ui:property name="div-major">8</ui:property>
  <ui:property name="div-minor">4</ui:property>
  <ui:property name="color">rgb(240,206,206)</ui:property>
  <ui:property name="show-major-ticks">true</ui:property>
  <ui:property name="show-major-labels">true</ui:property>
  <ui:property name="intersect-value">45</ui:property>
</ui:object>
<ui:object id="ax1" type="polar-chart-axis">
  <ui:property name="label">Distance [in]</ui:property>
  <ui:property name="polar-axis-type">magnitude</ui:property>
  <ui:property name="min">5</ui:property>
  <ui:property name="max">10</ui:property>
  <ui:property name="div-major">10</ui:property>
  <ui:property name="div-minor">4</ui:property>
  <ui:property name="color">rgb(114,159,207)</ui:property>
  <ui:property name="show-major-ticks">true</ui:property>
  <ui:property name="show-major-labels">true</ui:property>
  <ui:property name="intersect-value">10</ui:property>
</ui:object>
```

Table of Configurable Attributes

attribute	default value
id	null

Table of Configurable Properties

property	data type	default value

Color Map

This element is added to the interface as a legend showing a gradient

of colors between a set minimum and maximum color value. The gradient

type is selected to interpolate colors as either RGB or HSV.

This section shows how to add a color map to a configuration file.

```
<ui:object id="cm0" type="colormap">
  <ui:property name="min">0</ui:property>
  <ui:property name="max">10</ui:property>
  <ui:property name="div-major">10</ui:property>
  <ui:property name="div-minor">4</ui:property>
  <ui:property name="show-major-ticks">true</ui:property>
  <ui:property name="show-minor-ticks">true</ui:property>
  <ui:property name="show-major-labels">true</ui:property>
  <ui:property name="min-color">rgba(0,0,255,0.8)</ui:property>
  <ui:property name="max-color">rgba(255,0,0,0.8)</ui:property>
  <ui:property name="gradient">rgb</ui:property>
</ui:object>
```

Table of Configurable Attributes

attribute	default value
id	null

Table of Configurable Properties

property	data type	default value
min | double | null		
max | double | null		
div-major	int	10
div-minor	int	2
show-minor-ticks	bool	true
show-major-ticks	bool	true
show-major-labels	bool	true
min-color	string	null
max-color	string	null
gradient	string	null

Heat Map

This section shows how to add a polar heat map to a configuration file.

```
<ui:object id="hmap-0" type="heatmap">
    <ui:property name="xmin">0</ui:property>
    <ui:property name="xmax">10</ui:property>
    <ui:property name="ymin">0</ui:property>
    <ui:property name="ymax">10</ui:property>
    <ui:property name="zmin">0</ui:property>
    <ui:property name="zmax">10</ui:property>
    <ui:property name="min-color">rgba(114,159,207,0.8)</ui:property>
    <ui:property name="max-color">rgba(239,41,41,0.8)</ui:property>
    <ui:property name="interpolation-type">none</ui:property>
    <ui:property name="rows">4</ui:property>
    <ui:property name="columns">4</ui:property>
   <!--
      - Can contain <ui:object> element of type:
      -
      -  * "channel-matrix": Dactl.ChannelMatrix
      -->
</ui:object>
```

Table of Configurable Attributes

attribute	default value
id	null

Table of Configurable Properties

property	data type	default value
xmin	double	null
xmax	double	null
ymin	double	null
ymax	double	null
zmin	double	null
zmax	double	null
interpolation-type	string	“none”
rows	int	null
columns	int	null

A chart with heatmap data as it appears when added to the interface.

Here the color values have been made translucent by editing the alpha value. This allows the grid lines to show through.

Polar Heat Map

This section shows how to add a polar heat map to a configuration file.

```
<ui:object id="pg2chart0hm0" type="heatmap" subtype="polar">
    <ui:property name="magnitude-min">0</ui:property>
    <ui:property name="magnitude-max">10</ui:property>
    <ui:property name="angle-min">0</ui:property>
    <ui:property name="angle-max">360</ui:property>
    <ui:property name="zmin">0</ui:property>
    <ui:property name="zmax">10</ui:property>
    <ui:property name="interpolation-type">none</ui:property>
    <ui:property name="rings">10</ui:property>
```

```
    <ui:property name="sectors">8</ui:property>
    <!--
        - Can contain <ui:object> element of type:
        -
        -   * "channel-matrix": Dactl.ChannelMatrix
        -->
</ui:object>
```

Table of Configurable Attributes

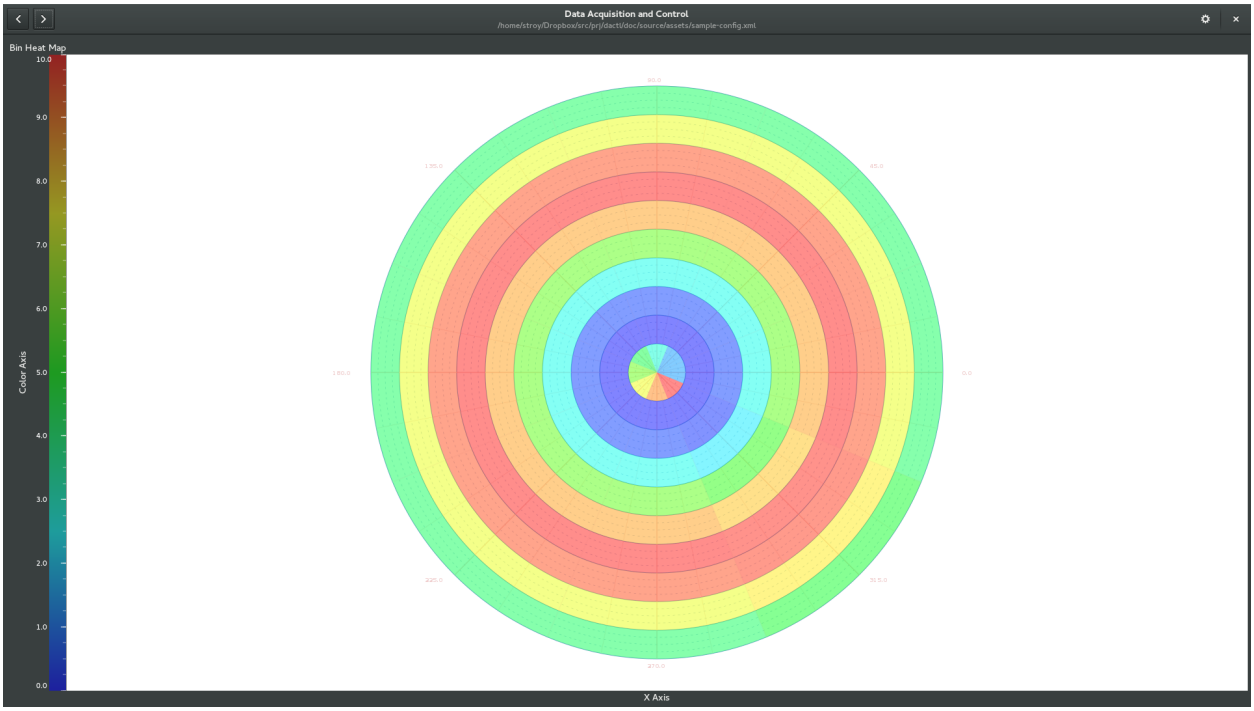
attribute	default value
id	null

Table of Configurable Properties

property	data type	default value
magnitude-min	double	null
magnitude-max	double	null
angle-min	double	null
angle-max	double	null
interpolation-type	string	“none”
rings	int	null
sectors	int	null

A polar chart with polar heatmap data as it appears when added to the interface.

Here the color values have been made translucent by editing the alpha value. This allows the grid lines to show through.



Channel Matrix

A channel matrix is a container of triplet data points as required by the heat

map chart drawable types.

This section shows how to add a channel matrix to a configuration file.

```
<ui:object id="pg2chart0hm0ary0" type="channel-matrix">
    <!--
        - Can contain <ui:object> element of type:
        -
        -   * "channel-matrix-element": Dactl.ChannelMatrixElement
        -->
</ui:object>
```

Table of Configurable Attributes

attribute	default value
id	null

Channel Matrix Element

This section show how to add a channel matrix element to a configuration file

as required by the channel matrix type.

```
<ui:object id="pg2chart0hm0ary0p00" type="channel-matrix-element">
  <ui:property name="a">0.5</ui:property>
  <ui:property name="b">22.5</ui:property>
  <ui:property name="chref">/udp64</ui:property>
</ui:object>
```

Table of Configurable Attributes

attribute	default value
id	null

Table of Configurable Properties

property	data type	default value
a | double | null		
b | double | null		
chref | string | null		

CHAPTER 4

Usage

Page Selection

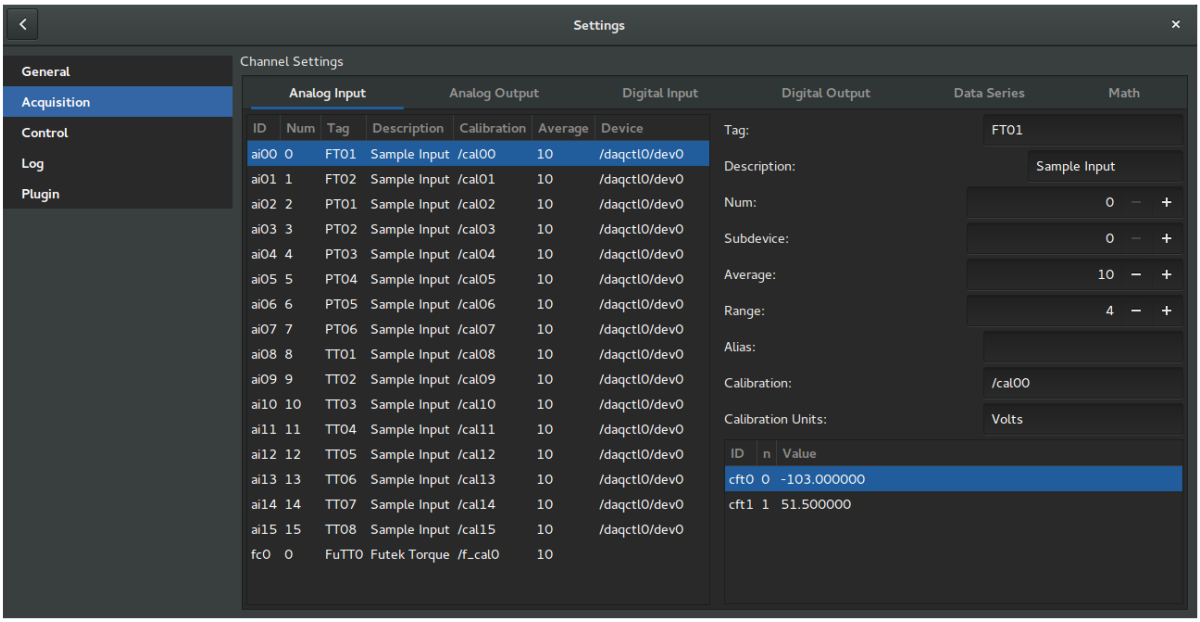
The following figure shows the page selection button:

Title Block

The following figure shows the title block:

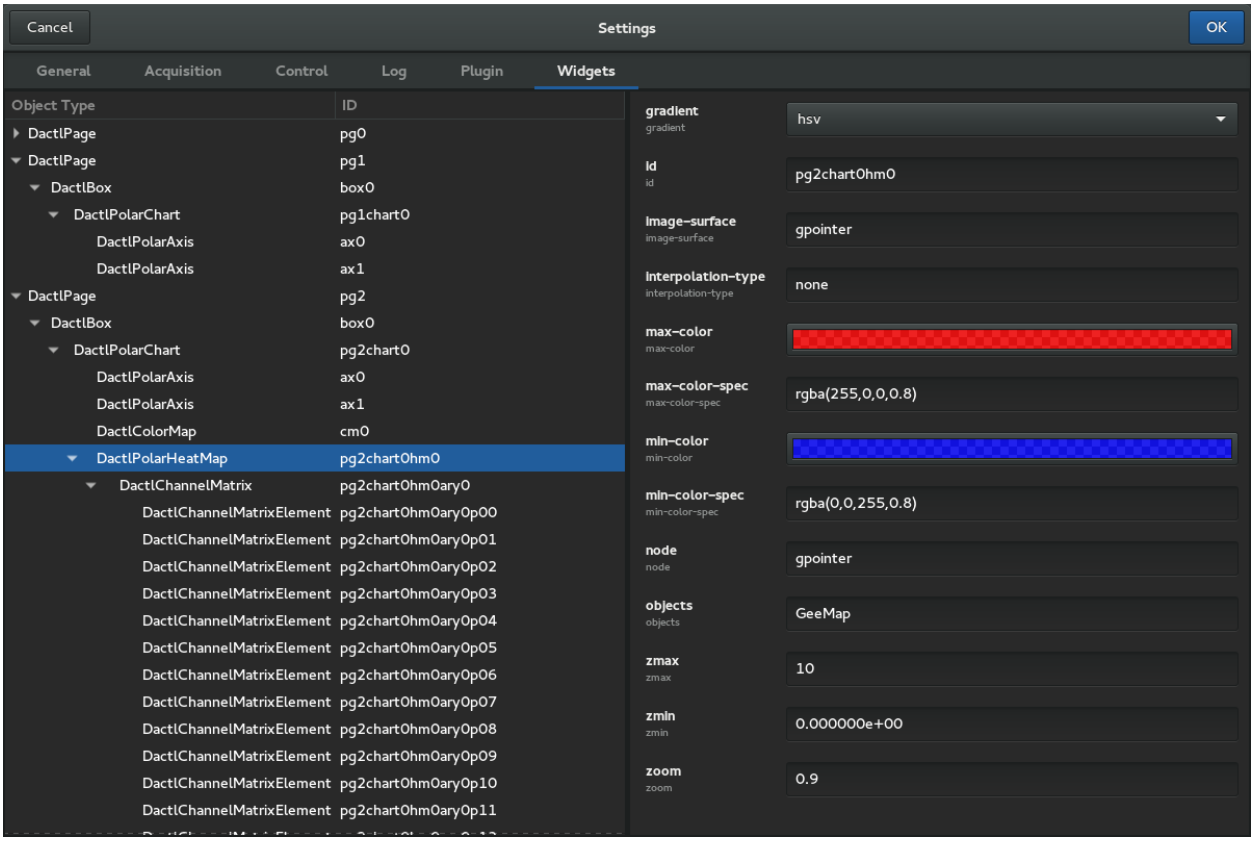
Setting Page

The following figure shows the setting page:



Configuration

The following figure shows the preferences button:


Cancel
Settings
OK
General
Acquisition
Control
Log
Plugin
Widgets
Object Type
ID
DactlPage pg0
DactlPage pg1
DactlBox box0
DactlPolarChart pg1chart0
DactlPolarAxis ax0
DactlPolarAxis ax1
DactlPage pg2
DactlBox box0
DactlPolarChart pg2chart0
DactlPolarAxis ax0
DactlPolarAxis ax1
DactlColorMap cm0
DactlPolarHeatMap pg2chart0hm0
DactlChannelMatrix pg2chart0hm0ary0
DactlChannelMatrixElement pg2chart0hm0ary0p00
DactlChannelMatrixElement pg2chart0hm0ary0p01
DactlChannelMatrixElement pg2chart0hm0ary0p02
DactlChannelMatrixElement pg2chart0hm0ary0p03
DactlChannelMatrixElement pg2chart0hm0ary0p04
DactlChannelMatrixElement pg2chart0hm0ary0p05
DactlChannelMatrixElement pg2chart0hm0ary0p06
DactlChannelMatrixElement pg2chart0hm0ary0p07
DactlChannelMatrixElement pg2chart0hm0ary0p08
DactlChannelMatrixElement pg2chart0hm0ary0p09
DactlChannelMatrixElement pg2chart0hm0ary0p10
DactlChannelMatrixElement pg2chart0hm0ary0p11
gradient
gradient
hsv
id
id
pg2chart0hm0
image-surface
image-surface
gpointer
interpolation-type
interpolation-type
none
max-color
max-color
max-color-spec
max-color-spec
rgba(255,0,0,0.8)
min-color
min-color
min-color-spec
min-color-spec
rgba(0,0,255,0.8)
node
node
gpointer
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objects
GeeMap
zmax
zmax
10
zmin
zmin
0.000000e+00
zoom
zoom
0.9

CHAPTER 5

Indices and tables

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