

Dt100rc User Guide

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Date: 20 June 2005

<i>Rev</i>	<i>Date</i>	<i>Description</i>
1	040604	First issue
2	050620	Updated.
3	060127	

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1 Introduction

Dt100rc is the D-TACQ remote control GUI app. The App is implemented in pure Java, and so is portable across all major platforms. D-TACQ recommend Dt100rc for initial hardware evaluation, but it is also possible to base your entire data acquisition system on Dt100rc, and extensive automation and customisation possibilities are available.

Dt100rc is the reference implementation of the dt100 Remote Protocol, and it provides a logging channel to allow observation of the command protocol, this will be of great assistance to users writing their own client applications.

1.1 Features

- Connect to target, and configure it
- Run the shot with real time progress feedback
- Upload, store and view data post shot
- Handle continuous streaming data.
- Extensive stored state, automation and powerful scripting features.

1.2 References

1. 2G User Guide
2. Interface Control Document ICD

1.3 Software components

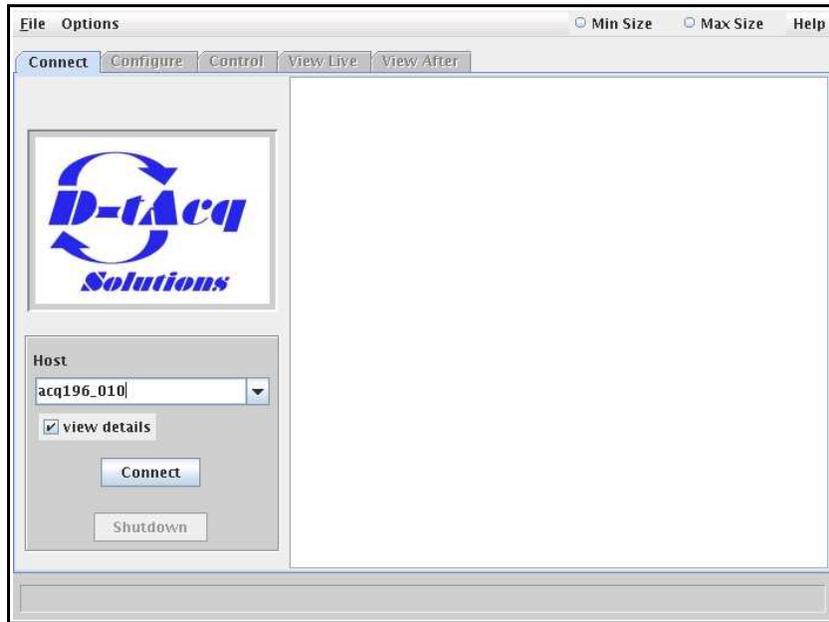
1. Requires Java 1.5 to run – download from java.sun.com
2. Includes JfreeChart charting component: <http://www.jfree.org/jfreechart/>
3. Includes BeanShell scripting : <http://www.beanshell.org/>
4. Command Line argument handling: <http://www.martiansoftware.com/jsap/>

2 View data in four easy steps

Dt100rc follows a tabbed workflow Connect, Configure, Control, View.

Dt100rc allows a quick connection direct to the network port of ACQ2xx, ACQ1xx to capture and view data. Dt100rc will also connect to the dt100d port on the host computer of a dt100 system.

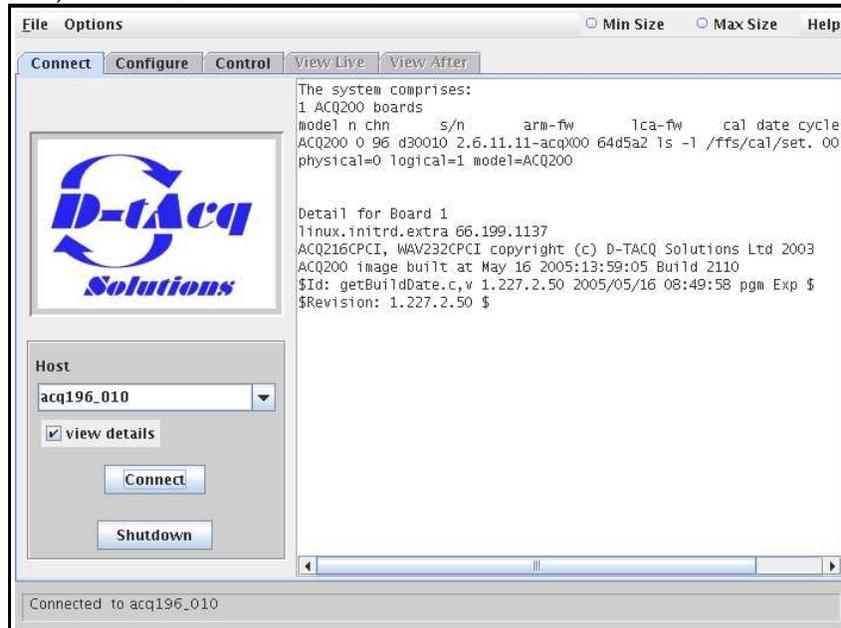
2.1 Connect



Enter the target IP host name / IP address in the box, press return, press connect.

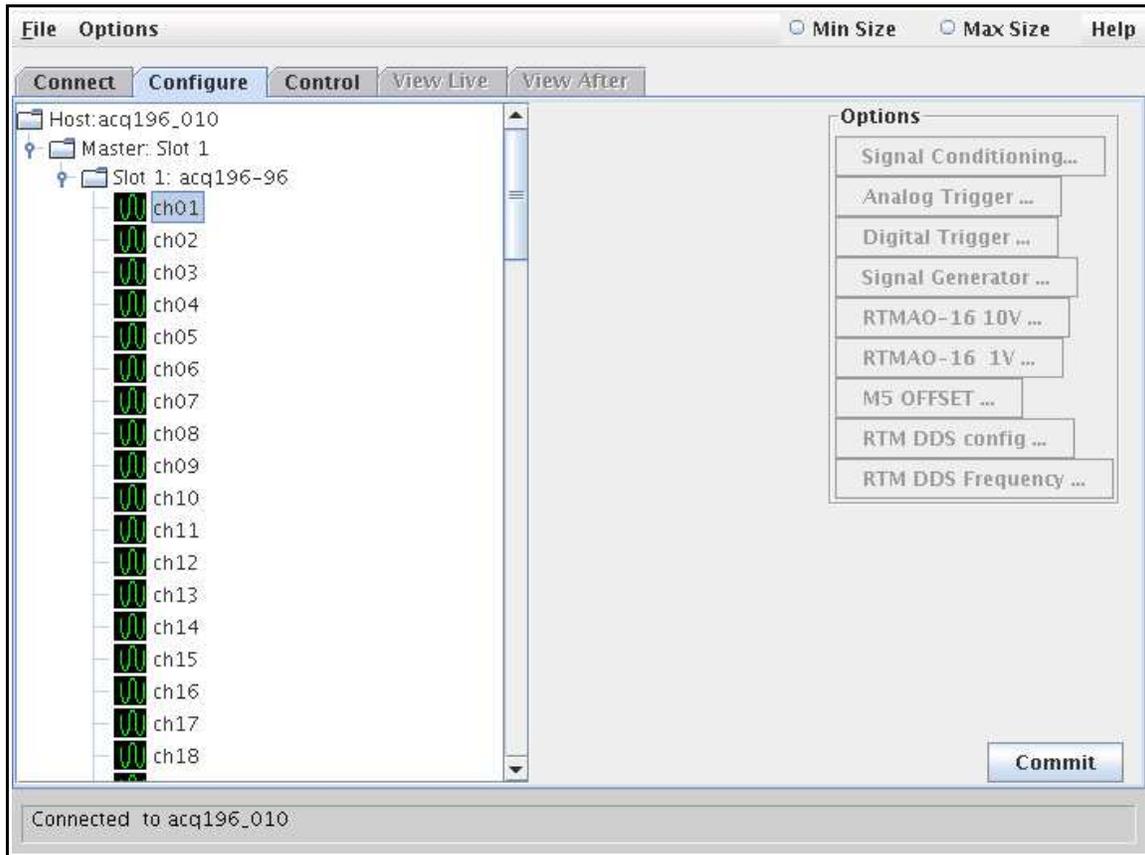
Check View Details for details

After Connection, the screen will look like this:



2.2 Configure:

Define the master board, optionally, masking channels
(open the tree, right click for menu)



Other device control options are enabled by automation script (described later).

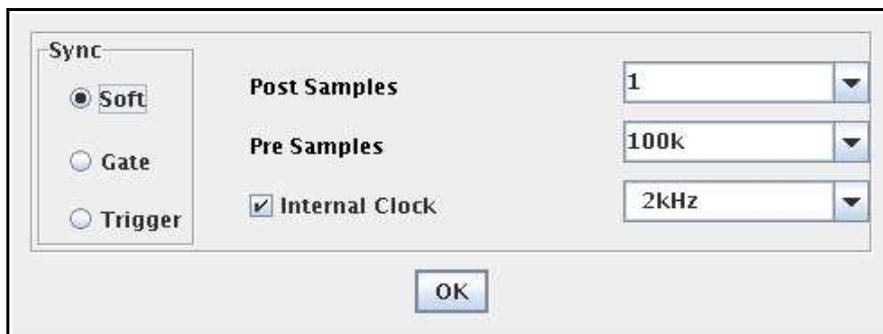
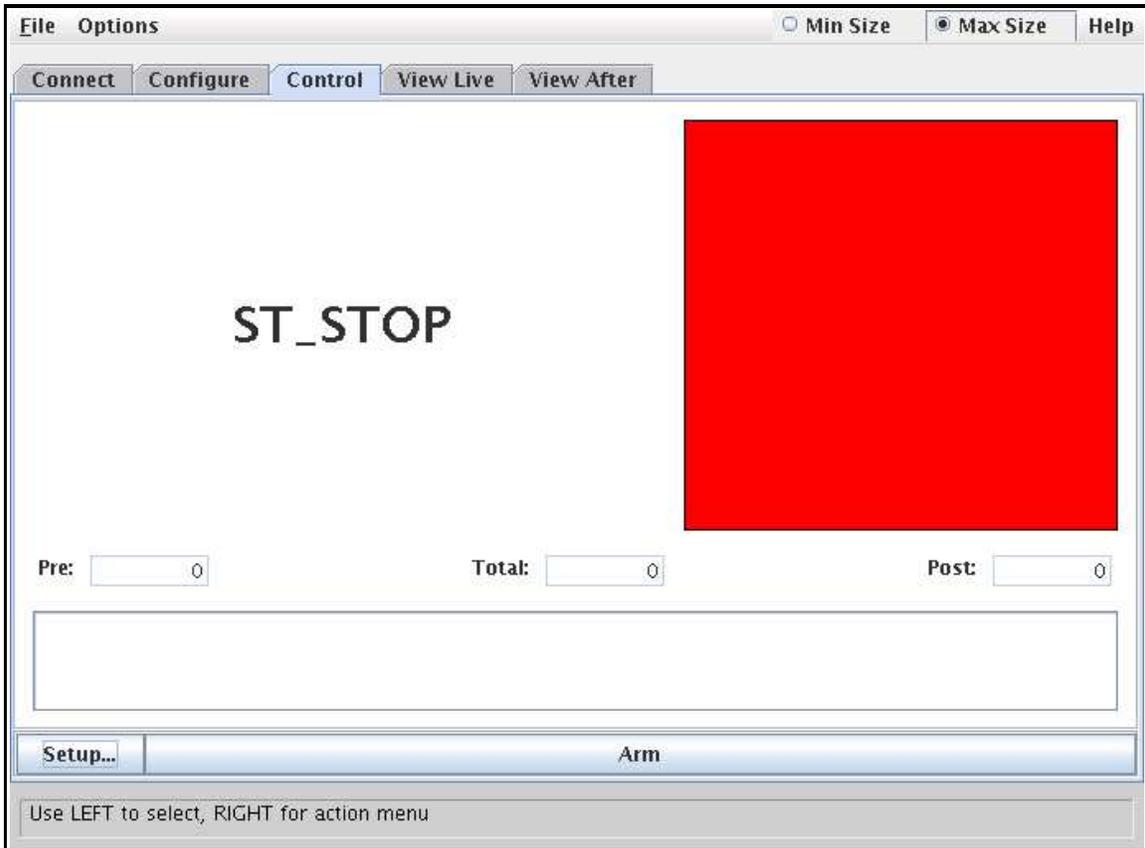
Press commit to gain access to the next tab:

2.3 Control.

Here you can control and view the state of captures.

First time: Try

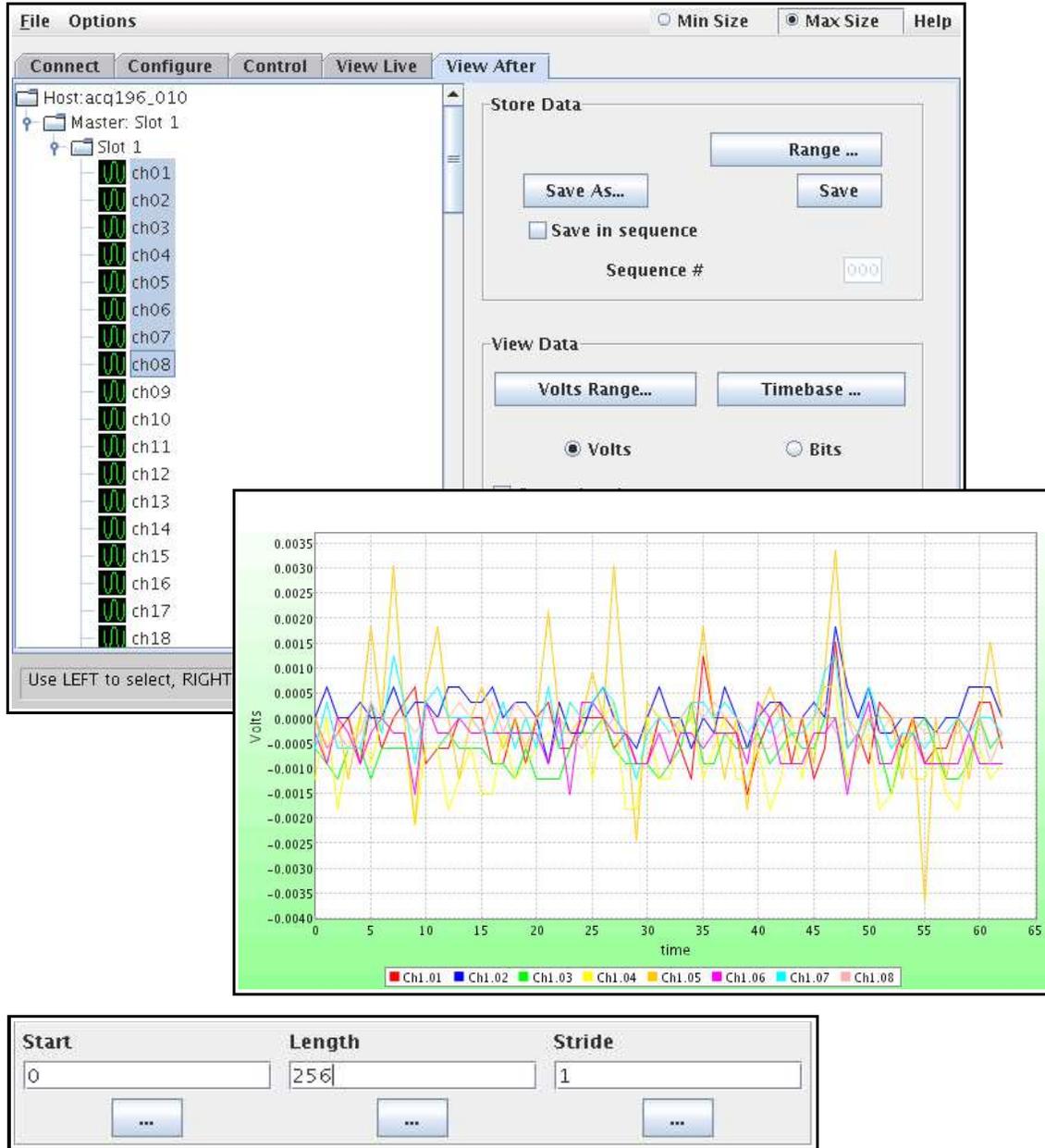
Soft Transient, Post 10k, Pre 0, Internal Clock 250kHz



2.4 View After

From here you can upload and view data.

Remember to select some (or all channels first).



Set the plot range using the Range dialog:

The same type of dialog lets you specify where to save files in binary format.

2.5 Streaming Live Data ; View Live

Continuous streaming to host via ethernet is supported. The data may be stored to disk, plotted in a live Scope display or optionally posted to post processing.

Please note that the ethernet streaming cannot support full data rates. Typically 96 channels x 10kHz on ACQ196CPCI and 8 channels x 1MHz on ACQ216CPCI are comfortable options.

- Connect and configure channels in the normal way
- Select sample rate and and Pre-samples. Choose Channels, sample rate to suit available bandwidth. 100K samples is a good pre-trigger number.
- Start Capture.
- View Live ! Control ! Select Channel Count, Start Streaming.
- View Live ! View ! Specify a set of channels to view and plot:

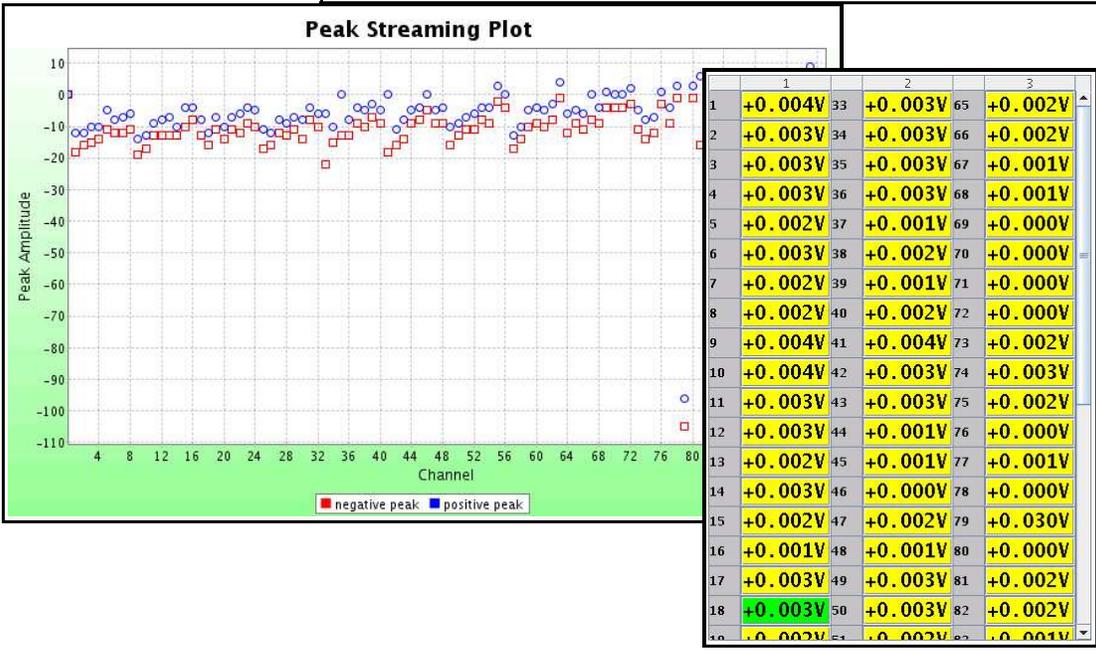
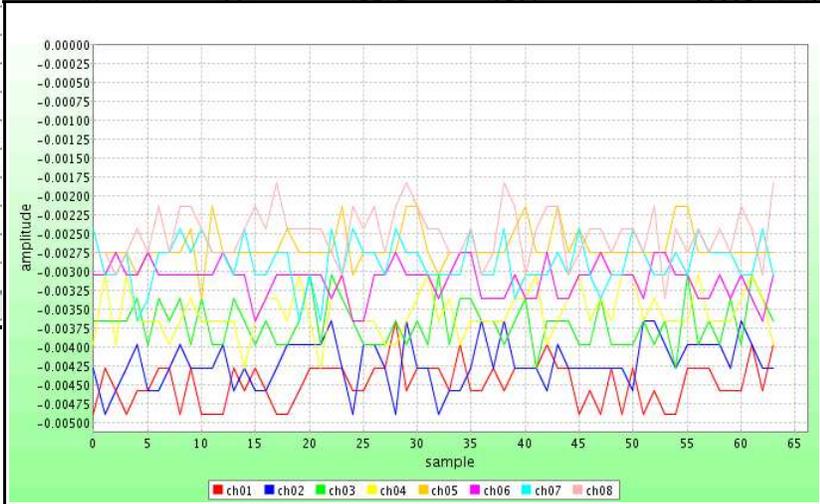
The screenshot shows a software window titled "File Options" with a "Max Size" button. The "View Live" tab is active, displaying the "Control Live Data Streaming" configuration panel. The panel contains the following elements:

- Max Channels:** A dropdown menu set to "96".
- Subrate:** A dropdown menu set to "1".
- MultiFrame:** A checked checkbox.
- Save Root:** An unchecked checkbox.
- Set Root...:** A button next to an empty text field.
- On Second Processing:** An unchecked checkbox.
- Host:** A text field containing "localhost".
- Port:** A text field containing "53506".
- dtacqutils.Job:** A text field containing "job".
- Posts/Gets/Execs/Backlog:** An empty text field.
- Connect:** A button.
- Start:** A button.

At the bottom of the window, there is a "Run /" button.

Streaming Data Setup Form

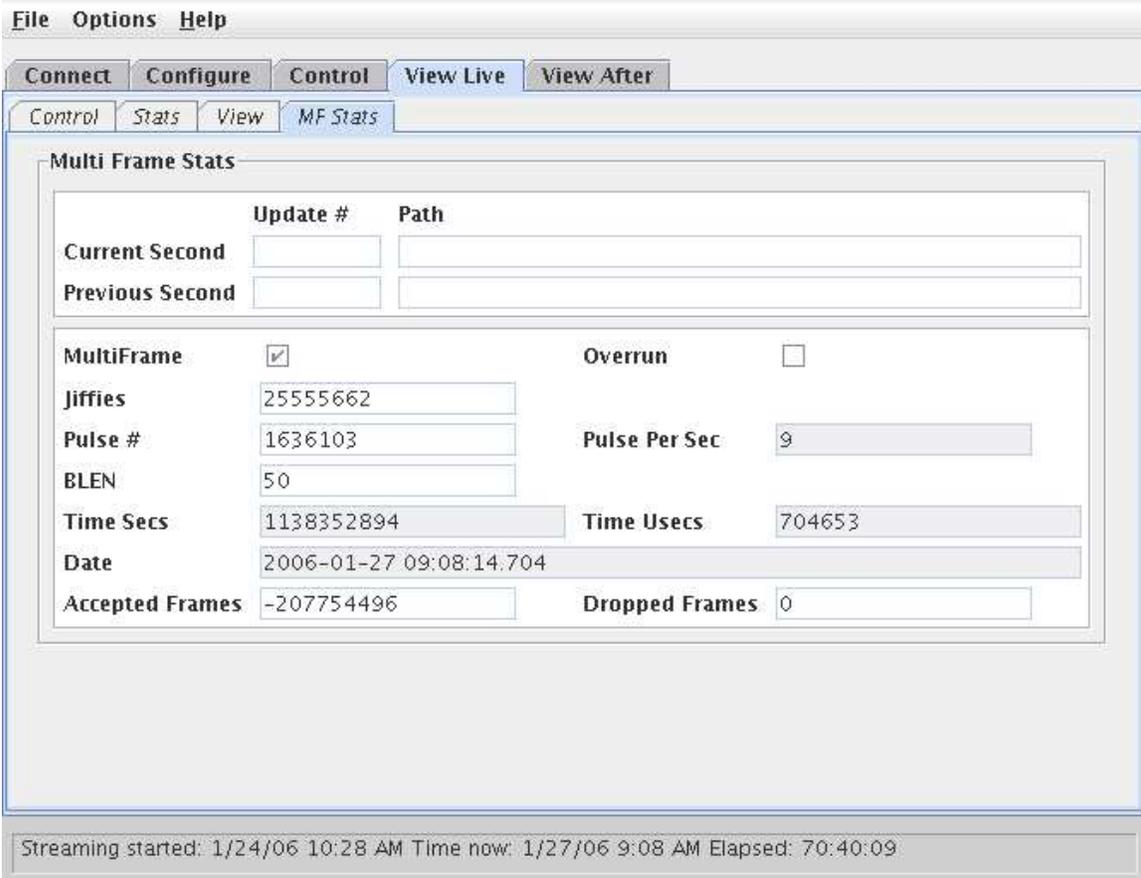
SFR	SCC	nX	TR?	DIO	EXTRA	TAG	ch01
0.0	160042	1	T	fe	cafe	fffe	-0.005
0.1	160043	1	T	ed	cafe	ffed	-0.004
0.2	160044	1	T	f0	cafe	fff0	-0.005
0.3	160045	1	x	01	cafe	8301	-0.005
0.4	160046	0	x	00	cafe	0400	-0.004
0.5	160047	1	x	00	cafe	8500	-0.004
0.6	160048	0	x	00	cafe	0600	-0.005
0.7	160049	0					
0.8	160050	1					
0.9	160051	1					
0.10	160052	1					
0.11	160053	0					
0.12	160054	1					
0.13	160055	1					
0.14	160056	1					
0.15	160057	0					
0.16	160058	0					



Live Viewing Options – Tabular, Scope, Peak and DVM

2.6 Streaming data options

Streaming may be sustained for long periods. In the picture, the ACQ system has been running for 70 hours at 4 pulses per second, and the 64 bit frame count has rolled over.



The “Save Raw Data” option saves raw data to a series of files structured in an Hour/Minute/Sec directory tree structure.

The “onsecond processing” option allows dt100rc to signal a post processing task to do additional work on the data.

The streaming raw data contains a “Frame Word” - the structure is fully defined in the ICD, but the live table display can include a breakdown of the Frame Word structure and this is a useful aid to understanding the structure of the data.

SFR	SCC	nK	TR?	DIO	EXTRA	TAG	ch04	ch05	ch06	ch07	ch08	ch09	ch
0.0	-443865664	0	x	fe	cafe	00fe	0x0013	0x0014	0x0014	0x0015	0x0012	0x0010	0x0018
0.1	-443865663	0	x	ed	cafe	01ed	0x0013	0x0012	0x0013	0x0015	0x0014	0x0010	0x0016
0.2	-443865662	0	x	f0	cafe	02f0	0x0014	0x0013	0x0011	0x0014	0x0013	0x0011	0x0017
0.3	-443865661	0	x	01	cafe	0301	0x0012	0x0013	0x0012	0x0014	0x0014	0x0010	0x0018
0.4	-443865660	0	x	00	cafe	0400	0x0011	0x0011	0x0014	0x0012	0x0012	0x0010	0x0018
0.5	-443865659	0	x	00	cafe	0500	0x0012	0x0012	0x0011	0x0015	0x0012	0x0016	0x0018
0.6	-443865658	1	x	01	cafe	0601	0x0014	0x0012	0x0013	0x0012	0x0014	0x0016	0x0012
0.7	-443865657	1	x	05	cafe	0705	0x0012	0x0011	0x0013	0x0013	0x0013	0x0013	0x0012
0.8	-443865656	1	x	f2	cafe	08f2	0x0013	0x0010	0x0014	0x0013	0x0014	0x0015	0x0013
0.9	-443865655	0	x	ce	cafe	09ce	0x0011	0x0012	0x0014	0x0014	0x0013	0x0016	0x0014
0.10	-443865654	1	x	aa	cafe	0aaa	0x0011	0x0011	0x0012	0x0014	0x0012	0x0014	0x0011
0.11	-443865653	0	x	55	cafe	0b55	0x0013	0x0010	0x0013	0x0014	0x0014	0x0013	0x0012
0.12	-443865652	0	x	f1	cafe	0cf1	0x0012	0x0010	0x0014	0x0014	0x0014	0x0016	0x0012
0.13	-443865651	1	x	20	cafe	0d20	0x0012	0x0013	0x0012	0x0013	0x0011	0x0016	0x0013
0.14	-443865650	0	x	00	cafe	0e00	0x0012	0x0012	0x0012	0x0013	0x0013	0x0015	0x0014
0.15	-443865649	0	x	b0	cafe	0fb0	0x0010	0x0012	0x0012	0x0013	0x0013	0x0015	0x0014
0.16	-443865648	1	x	00	cafe	0f00	0x0012	0x0013	0x0014	0x0012	0x0010	0x0016	0x0013
0.17	-443865647	1	x	00	cafe	0f00	0x0013	0x0012	0x0013	0x0013	0x0012	0x0014	0x0013
0.18	-443865646	0	x	d1	cafe	10d1	0x0013	0x0011	0x0013	0x0012	0x0013	0x0014	0x0011
0.19	-443865645	1	x	0d	cafe	110d	0x0013	0x0012	0x0013	0x0014	0x0014	0x0015	0x0012
0.20	-443865644	0	x	10	cafe	1210	0x0014	0x0012	0x0014	0x0014	0x0012	0x0014	0x0013
0.21	-443865643	0	x	d0	cafe	13d0	0x0015	0x0014	0x0015	0x0013	0x0012	0x0015	0x0012
0.22	-443865642	0	x	00	cafe	1400	0x0012	0x0012	0x0012	0x0014	0x0014	0x0013	0x0014
0.23	-443865641	1	x	32	cafe	1532	0x0012	0x0011	0x0013	0x0015	0x0014	0x0014	0x0012
0.24	-443865640	0	x	00	cafe	1600	0x0013	0x0012	0x0011	0x0011	0x0012	0x0014	0x0013
0.25	-443865639	0	x	01	cafe	1701	0x0012	0x0011	0x0013	0x0014	0x0014	0x0014	0x0012
0.26	-443865638	1	x	00	cafe	1800	0x0010	0x0011	0x0013	0x0013	0x0010	0x0013	0x0012
0.27	-443865637	0	x	f1	cafe	19f1	0x0013	0x0011	0x0014	0x0014	0x0010	0x0015	0x0012
0.28	-443865636	0	x	00	cafe	1a00	0x0013	0x0010	0x0013	0x0014	0x0015	0x0014	0x0012

Drawing 1: Table view allows viewing of Frame meta-data

3 Debug and monitoring Options.

The debug menu allows selection of various debug and monitoring channels.

4 Saved State and Automation

You can automate dt100rc in a number of ways to make usage easier.

The most obvious step is to save the connection state for future use. Then the process of loading the state, connecting and getting started may be automated. Automation is achieved via a combination of saved state, command line switches and use of BeanShell startup scripts.

4.1 Saving State

When you have configured Dt100rc and wish to save state, use *File ! SaveAs* to save the state. The convention recommended by D-TACQ and followed in this guide is to save the state to `states/HOSTNAME.state`.

4.2 BeanShell

Dt100rc includes BeanShell, a powerful Java scripting interpreter that allows access to all public objects in the application. You don't have to code BeanShell – although this is possible given that the source code is provided, but a number of useful example scripts are provided:

```
[pgm@islay dt100rc]$ ls -l bsh/
```

- `connect.bsh` : automate connect to target (requires State)
- `console.bsh` : starts a BeanShell console
- `enable-all-config.bsh` : enables ALL optional features – we recommend customizing this script to show only the features available on your target.
- `make-one2one-channel-mapping.bsh` : changes channel map to physical order.
- `make-timestamp-lut.bsh` : changes channel map for timestamp special firmware.
- `stream32.bsh` : sets sample size for 32 bit data streaming

Beanshell scripts are invoked using the `-bsh` command line option, multiple `-bsh` selections are possible.

4.3 Command Line Arguments.

- `--state STATEFILE` – load this state file at start
- `--host HOSTNAME` – use this hostname (useful before STATEFILE created)
- `--bsh SCRIPT` – execute this BeanShell script.
- `--geometry WidthxHeight` – custom initial screen size

4.4 Automating Multiple Instances.

For systems with multiple networked cards, it is useful to have one instance of Dt100rc per card. Multiple Dt100rc instances may be configured as slaves of a single desktop control. The desktop allows central selection of which dt100rc instances are on display, and allows centralised Start/Stop control.

Communication between clients is achieved using Java RMI; typically a local RMI registry is used, but control across multiple machines may be implemented; An appropriate RMI policy would have to be specified.

- Check RMI policy (default: `~/RC/rmid.policy`)
- Run local rmiregistry : `rmiregistry &`
- Run slaves
- Run desktop – `dt100-desktop [slave-ip ...]`
- Use View tab on desktop to control view, Acton tab to control actions
- Scriptable command line version of desktop available – `dt100rc.cmd`
- Useful “egg timer function built in to dt100rc: `countdownMaster <seconds>`



Dt100-desktop and CountdownMaster

5 Additional Features and Customization.

Customisation is achieved by turning on additional features, generally by use of a BeanShell script.

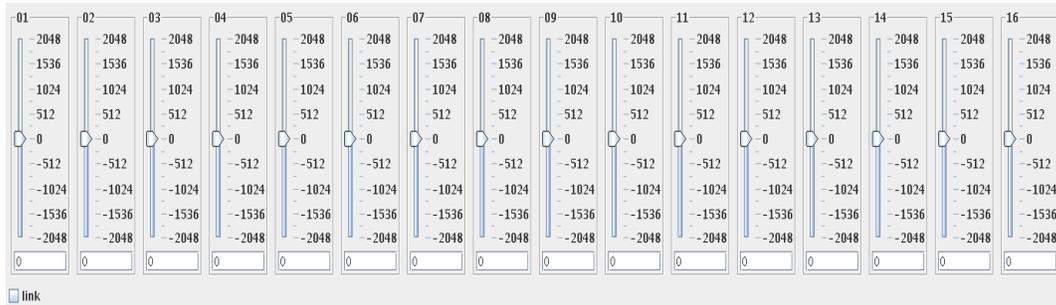
```
[pgm@islay dt100rc]$ more bsh/enable-all-config.bsh
rcui.ConfigPanel.getInstance().configSignalGenerator.setEnabled(true);
rcui.ConfigPanel.getInstance().configAO_DC10V.setEnabled(true);
rcui.ConfigPanel.getInstance().configAO_DC01V.setEnabled(true);
rcui.ConfigPanel.getInstance().configM5_OFFSET.setEnabled(true);
rcui.ConfigPanel.getInstance().configRTMDDS.setEnabled(true);
```

5.1 AO Control Panel

For use with ACQ196-RTMAO16:

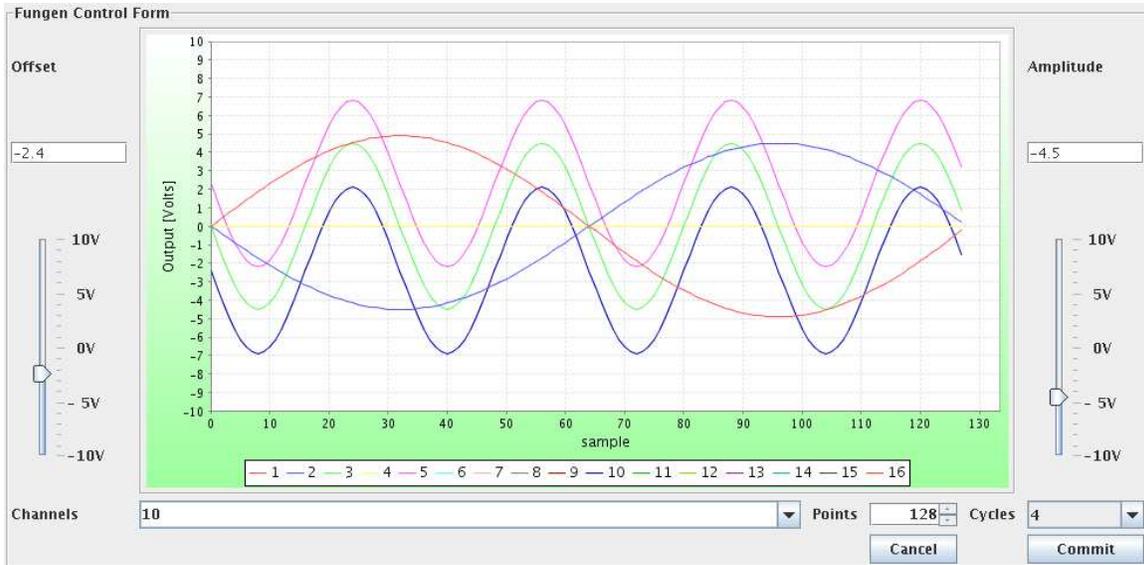
Provides one slider per channel control of AO level.

The sliders may be controlled individually or coupled together. The Panel is supplied in two ranges, 1V, 10V.



5.2 Signal Generator Control Panel

Also for use with the “fungen service” on ACQ196-RTMAO16, the signal generator panel allows configuration of sine waves with continuously adjusted offset, amplitude and cycle count. Planned extensions are for ramp, triangle, square and arbitrary waveforms:



5.3 M5 Input Offset Voltage Control Panel

Slider per channel control of M5 input offset voltage.

The sliders may be controlled individually or coupled together

5.4 RTMDDS Control Panel

An optional control panel is provided to control the RTMDDS DDS clock module, comprising a modal dialog to make initial settings, and a slider dialog to allow continuous control of clock rate.

Custom Options : M5 Input offset , , RTMDDS:

The image shows a software interface with 16 sliders, numbered 01 to 16, arranged in two rows of eight. Each slider has a vertical scale from -32768 to 32768 with major ticks at -32768, -24576, -16384, -8192, 0, 8192, 16384, 24576, and 32768. Below each slider is a small input field containing the number '0'. A 'link' checkbox is located at the bottom left of the slider area. Overlaid on this interface is the 'RTM DDS Control Panel' dialog box.

RTM DDS Control Panel

Input Clock

- REFCLK
- DI0
- DI1
- DI2
- DI3
- DI4
- DI5

Frequency [Hz]: 66,666,666

Ref Clock Multiplier: 4 8 20

DDS Output

- D00
- D01
- D02
- D03
- D04
- D05

Minimum [Hz]: 1000000

Default [Hz]: 10000000

Maximum [Hz]: 100000000

RIO Output Enables

- D00
- D01
- D02
- D03
- D04
- D05

Buttons: OK, Cancel

The image shows a frequency control slider. At the top, it displays '1,000,000 Setpoint Clock Frequency' and '100,000,000 Actual Clock Frequency'. Below this is a horizontal slider with a central knob. The current value on the slider is '10,000,000'. There are left and right arrow buttons on the slider, and a '--' symbol at the far right.

