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microDAQX-LV

User Guide

SOFTWARE MANUAL

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Chell's policy of continuously updating and improving products means that this manual may contain minor differences in specification and design from the actual software supplied.

CONTENTS:

1 Quick Start

This section outlines the steps necessary to start collecting data with the microDAQX-LV VI with a single microDAQ using Ethernet. This section does not deal with all the microDAQ options, which are described further on in this manual or in the microDAQ operating manual.

[1] Connecting up.

The microDAQ is supplied configured from the factory. It will have been given an i/p address that is written on the microDAQ. Connect the microDAQ to the PC by an Ethernet lead.

NOTE: If the microDAQ is connected directly to a PC then a crossed RJ45 lead will need to be used. If it is connected to a hub/switch then a normal RJ45 lead should be used.

[2] Powering up the microDAQ.

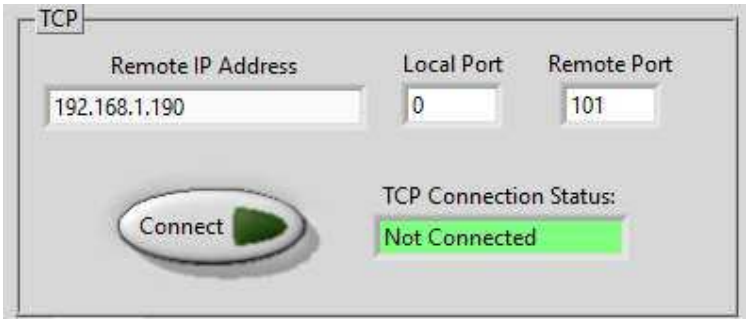
Turn on the power to the microDAQ. The blue LED will light for a few seconds, whilst initialising and will then start to flash in normal run mode.

[3] Running the software.

The software can be used with or without a license for NI LabVIEW 2024. If you are wishing to run the microDAQX-LV Executable (standalone VI) the LabVIEW Runtime software is required to be installed before the software can be launched, this can be obtained from the National Instruments website. If you are only using the microDAQX-LV VI project, you must run it in a suitably licensed version of LabVIEW (minimum NI LabVIEW 2024 Q1).

[4] Entering the i/p address.

The i/p address is entered in the comms tab as follows:



Enter the correct i/p address in the box.

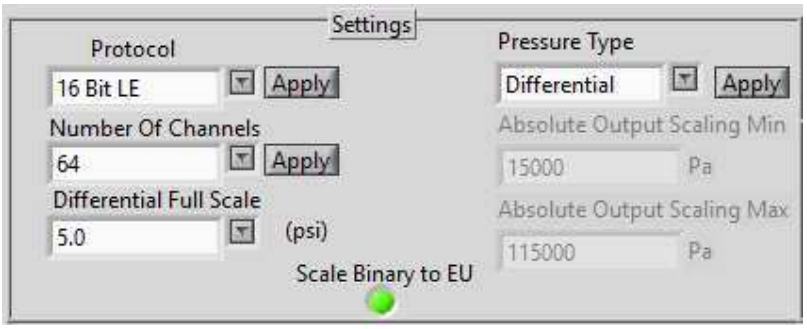
Then click the Connect button.

NOTE: If the system does not connect, look at the following:

Is the i/p address correct?
Is the link LED on the hub/switch? – If not, the wrong cable type may have been used.
Is the PC i/p address in the same domain as the microDAQ? In this case, the PC that is being used to connect to the microDAQ must have an i/p address starting with 192.168. The machine i/p must also be different to the microDAQ.

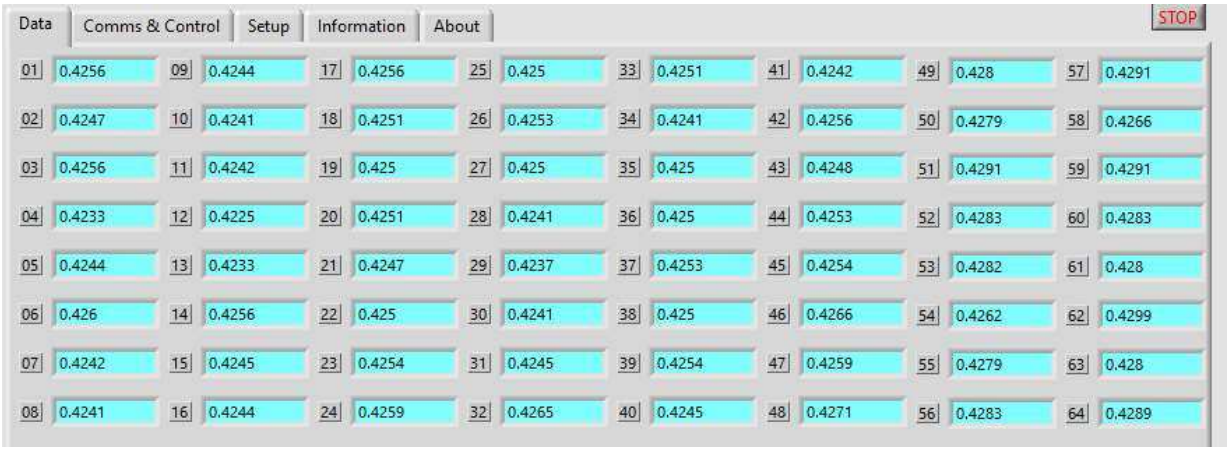
[5] Selecting the appropriate settings.

Ensure that the scale binary to full scale is selected. This will scale the 16-bit number transmitted from the device into the appropriate units. The number of channels and full scale will also need to be correct.



[6] Viewing the data.

The data will now be viewable on the Live Data tab:

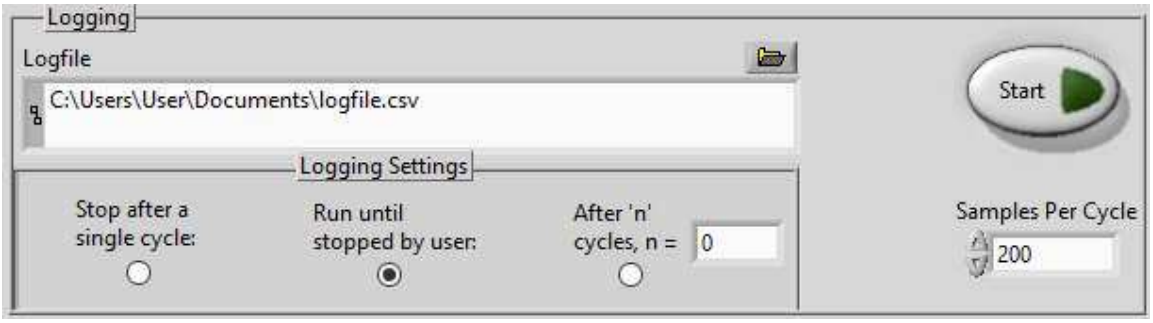


[7] Re-zeroing the data.

The data can be re-zeroed by using the Rezero button in the Controls section on the Comms & Control tab, as shown below:

[8] Logging the Data.

The microDAQX-LV software can log data to disk in CSV format. The file name is that listed in the Logging tab, as shown below:



If this window is configured as above, when the start button is pressed, the software will write 200 samples at a time to the file and will keep running until the same button is pressed. For more information, look at the Logging tab section of this manual (section 3.3.3).

2 microDAQX-LV Introduction and Overview

microDAQX-LV is a LabVIEW representation of the long standing microDAQX software made to interface with Chell's widely used microDAQ & flightDAQ devices running in default user mode and connected to a PC via TCP over Ethernet. It is designed to be functionally similar to microDAQX.

As with microDAQX, the user controls on the software implement microDAQ & flightDAQ's user interface commands (see document "900204 - Chell DAQ systems user programming guide."). A user may read scanner data directly from the device for basic diagnostic purposes and testing, or log received data to disk.

Note that although the user command set allows the alteration of a certain subset of device settings at run time, these changes are not stored to the device's non-volatile memory unless the "Burn to EEPROM" button on the "Setup" tab is used.

This manual supports microDAQX-LV V1.0.1, which in turn supports microDAQ3-64 firmware V1.0.20+.

Compatibility with reduced functionality is also supported on the following devices:
flightDAQ firmware V1.0.18+, microDAQ firmware V1.0.16+, microDAQ-Mk2 firmware V2.0.0+, and flightDAQ-Mk2 firmware V2.0.11+.

3 User Interface

3.1 Overview.

As mentioned previously, microDAQX-LV can be run to receive data from the device running in its standard user mode. Data may be logged to a comma separated value (CSV) text file and all the user commands may be activated from the controls on the VI. User controls and displays are organised into several different frames by category and are selected by clicking on the relevant tab.

The following sub-sections detail the user controls of the microDAQX-LV VI, and their functions by category.

3.2 Data Tab.

The data tab (shown in figure 3.1), displays the last received data from the device and is compatible with both 16bit LE and 16bit BE data. Received data packets of pressure readings are verified and split into their channels for display. If the output data is configured to include the reference channel and/or include timestamped data, these will also be shown at the bottom of the data tab in their respective positions.

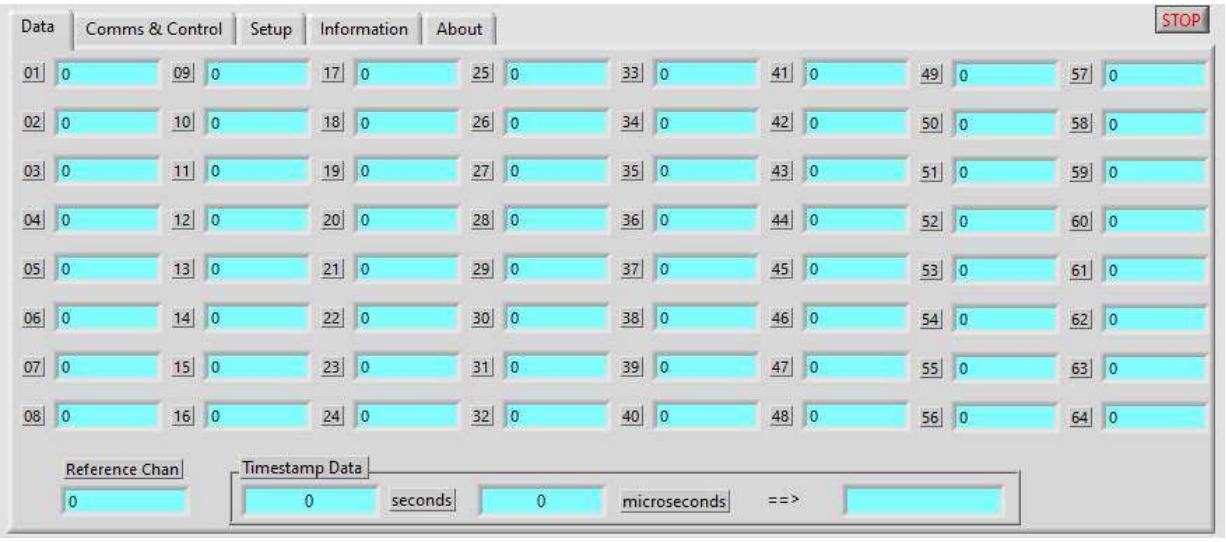


Figure 3.1, The Data Tab.

3.3 Comms & Control Tab.

Figure 3.2 shows microDAQX-LV's Comms and Control tab, which allows the user a degree of manual control over the connected unit while it is running. The actual command set available is detailed separately in the *DAQ user programming guide* document, and within microDAQX-LV is implemented as user controls.

It should be emphasised that the controls that are associated with a command parameter (for example the data delivery rate of a channel) do not necessarily show the current state of the parameter within the device. The device powers up with the settings stored in its EEPROM and the command buttons on microDAQX-LV allow the modification of certain parameters (to the values selected in the dropdown boxes), but only until the next reset unless the “Burn to EEPROM” button is used. It is therefore unlikely that the parameter value within the unit matches that of the microDAQX-LV display, unless the microDAQX-LV controls have been used to change that value since a reset.

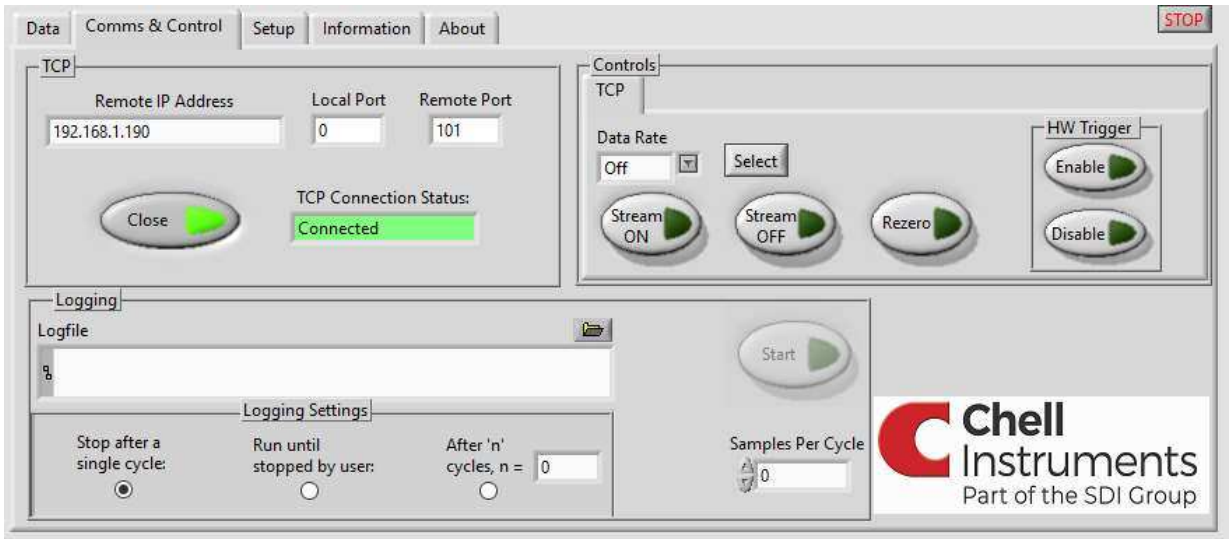


Figure 3.2, The Comms & Control Tab

On the Comms & Control tab there are multiple sections as detailed below:

3.3.1 TCP section.

The TCP section gives access to the settings for TCP used to communicate with an attached device. The TCP settings refer to the attached device, i.e. its designated IP address. The device should be assigned an IP address compatible with the network it is to run on (contact the network administrator), and a local port for the PC should be chosen. The absolute value is unimportant as long as it is not used by any other service. The remote port value is related to the chosen port within microDAQ and is fixed at 101; the value should therefore not be altered.

The TCP Connection may be manually connected and disconnected with the respective 'Connect' and 'Close' button, and the current status is shown in the green display box.

3.3.2 Controls section.

In the “Controls” section you can set the device to stream on and off, select a data rate for streaming, rezero the data and also Enable/Disable the Hardware trigger. Notre that the available data rates list covers a wide variety of DAQ devices, but that does not mean that all DAQ devices will support all listed data rates – check the operating manual of the individual device for the data rates supported.

3.3.3 Logging section.

The logging section allows for setup of the data logging function to store streamed data into a CSV file for post processing in Excel, etc. A buffering cycle comprises a fixed number of data points per channel received from the device, this number of samples being selected from the 'Samples per Cycle' value. By default, this value changes with the data rate, but can be reconfigured as necessary (if set the same as the data rate, logging to disk occurs once a second). The 'Logging Settings' frame controls when microDAQX-LV signals that it has data ready to be logged to disk in terms of completed buffer cycles. The total data points collected per channel is the product of the samples per cycle and the number of buffer cycles selected.

An overview of all the functions in the Comms & Control tab is provided in table 3.1.

User Control	Function
Local Port text box	Set the local port on the PC for TCP communication with the microDAQ/flightDAQ.
Remote IP text box	microDAQ & flightDAQ's IP address, as set from the embedded webserver - must be compatible with the network - refer to microDAQ documentation and network administrator.
Socket state (green box)	Current state of the TCP communications socket, and display of other information concerning TCP communication.
Connect/Close button.	Attempt to make a connection to the device using the parameters shown. When a device is connected, this button will change to “Close” which when pressed will close the connection to the device.
Stop after a single cycle radio button.	Data will log until a single cycle has occurred and then stop, based on the Samples per Cycle value.
Run until stopped by user radio button.	Data will continue to log until the user presses the stop button.
After ‘n’ cycles radio button.	Data will log until it reaches ‘n’ number of cycles.
“n = “ text box.	This value is used in conjunction with the “After ‘n’ cycles setting.
Logging Filename	Sets the filename & path of the CSV file written to at each logging event.
Samples per Cycle	The number of data points (per channel) comprising a buffer cycle.
Start/Stop logging button	Start/Stop the logging process.
Data Rate drop down	Selects the data rate for streamed data.
Stream On button	Starts the data streaming.
Stream Off button	Stops the data streaming
Rezero button	Perform a rezero operation.
H/W Trigger Enable button.	Enables the hardware trigger feature.
H/W Trigger Disable button.	Disables the hardware trigger feature.

Table 3.1, User Control Functions for the Comms and Control Tab.

3.4 Setup Tab.

This tab (shown in Figure 3.3) is used to send various setup commands to the device, if a device with partial compatibility is being used with this VI, please refer to the document 900204 - Chell DAQ systems user programming guide to confirm whether a setting is supported.

When the pressure type is set to differential, microDAQX-LV's differential full scale may be set on the drop-down box on this tab (Settings section) for the purpose of scaling received differential binary data to engineering units. When the pressure type is set to Absolute and Scale Binary to EU is selected, the absolute output scaling min and max values will be used instead – these values should match the values that are set on the webserver of the device.

It is important to note that these settings are volatile and will not be retained on a device reset unless the "Burn to EEPROM" button is used. Where there are settings without an apply button, for example the PTP settings, these values should be matched to what the value of the setting is on the embedded webserver. A full list of the controls available on this tab is shown below (table 3.2).

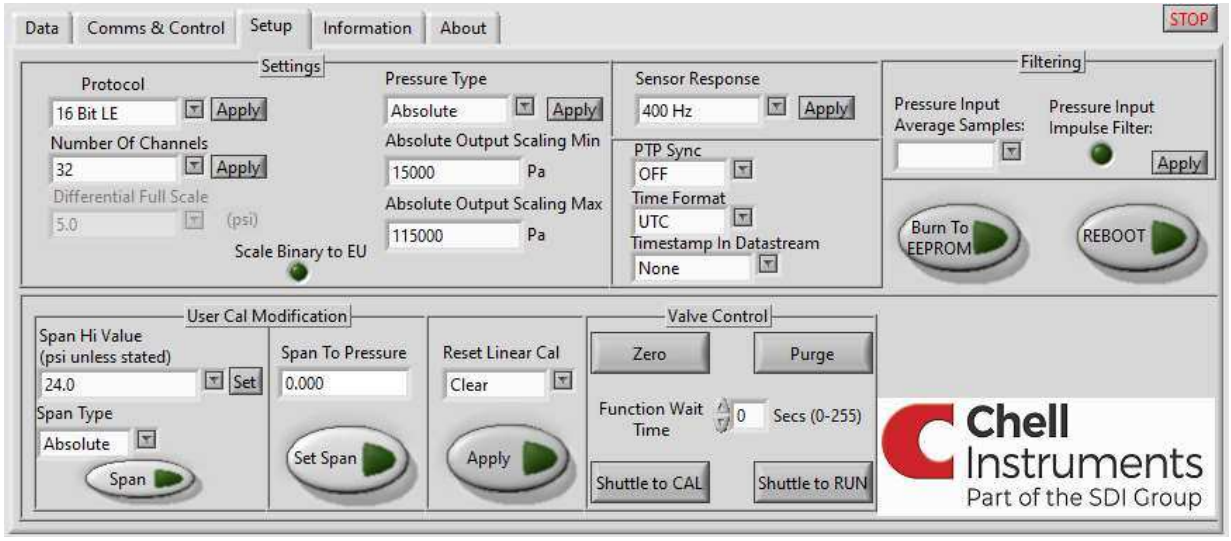


Figure 3.3, The Setup Tab.

User Control	Function
Protocol drop down	Select between 16 Bit LE and 16 Bit BE protocols.
Number Of Channels drop down	Sets the number of active channels.
Differential Full Scale drop down	Select the full scale of the device that is connected (this option is greyed out when pressure type is set to absolute).
Pressure type drop down	Sets the pressure type of the output stream to either Absolute pressure or a differential from the reference pressure
Absolute Output Scaling Min text box	Minimum value for the output scaling when the pressure type is set to Absolute (this text box is greyed out when the pressure type is set to differential)
Absolute Output Scaling Max text box	Maximum value for the output scaling when the pressure type is set to Absolute (this text box is greyed out when the pressure type is set to differential)
Scale Binary to EU button toggle	When this button is activated the binary pressure values are scaled to the EU values, dependant on the pressure type.

Sensor Response drop down	Sets the response mode of the internal sensors. The sensor response setting determines the maximum available data rate. Note: This setting will not be applied until the device is power cycled/reset.
PTP Sync drop down	Set whether the device has been configured on the webserver for PTP. Please note this setting must match to what has been set on the device's webserver.
Time Format drop down	Select between UTC and TAI time format for the timestamp.
Timestamp In Datastream drop down	Set whether the device has been configured to take a timestamp at the start of cycle or no timestamp at all. Please note this setting must match to what has been set on the devices webserver.
Pressure Input Average Samples drop down	applies a rolling average buffer – selected dropdown is the size of the averaging buffer
Pressure Input Impulse Filter	Turns the pressure input impulse filter on/off.
Burn To EEPROM button	Sends a burn to EEPROM command to the device.
REBOOT button	Sends a reboot command to the device.
Span Hi Value drop down and corresponding set button.	This drop down allows for the selection of the Span value to be used for differential Span ONLY (See Span A/65). Absolute Span Hi (where applicable) is fixed at 90% Sets the span hi pressure expected when performing a Span calibration. Once a value from the drop down has been selected it is important to press the "Set" button.
Span Type drop down	Select between absolute and differential span type
Span button	Sends set span request to the device.
Span To Pressure text box	Text box to input the value to use for a span to pressure action.
Set Span button	User span calibration to the supplied pressure inputted into the text box
Reset Linear Cal drop down	Either clears zero offsets, resets absolute and differential span values, then stores the values in EEPROM or stores the current zero, absolute span and differential span values to EEPROM.
Apply button	Sends the reset linear cal drop down selection to the device.
Zero button (Valve Control)	Performs a Zero function: 1. Shuttle scanner to CAL mode 2. Wait for configured time (from text box) Shuttle scanner to RUN mode
Purge button	Performs a Purge function: 1. Shuttle scanner to CAL mode 2. Switch on external purge valve 3. Wait for configured time (from text box) 4. Switch off external purge valve Shuttle scanner to RUN mode
Shuttle to CAL button	Moves the scanner shuttle valve to CAL mode.
Shuttle to RUN button	Moves the scanner shuttle valve to RUN mode.

Table 3.2, User Control Functions for the Setup Tab.

3.5 Information Tab.

The Device Status can be retrieved from this information tab (Shown below Figure 3.4) by clicking the Get Status button. This will ask the device for its current status as requested in the associated dropdown box. There are three main levels of status – Short, With Temp and Full – as well as some other minor status reports.

All three main levels of Status will update the Function Status frame indicators to show the main operation status of the device. microDAQX-LV will attempt to decode the full status packet received from the device and populate the Full Status Report fields. Depending on the type of device connected and its firmware version, some of these fields may be left blank as that status info may not be available.

Users of the old microDAQX application may be familiar with the text window of that program's Status string tab, that shows the actual received status packet. This can be accessed in microDAQX-LV by clicking the 'Status String' tab.

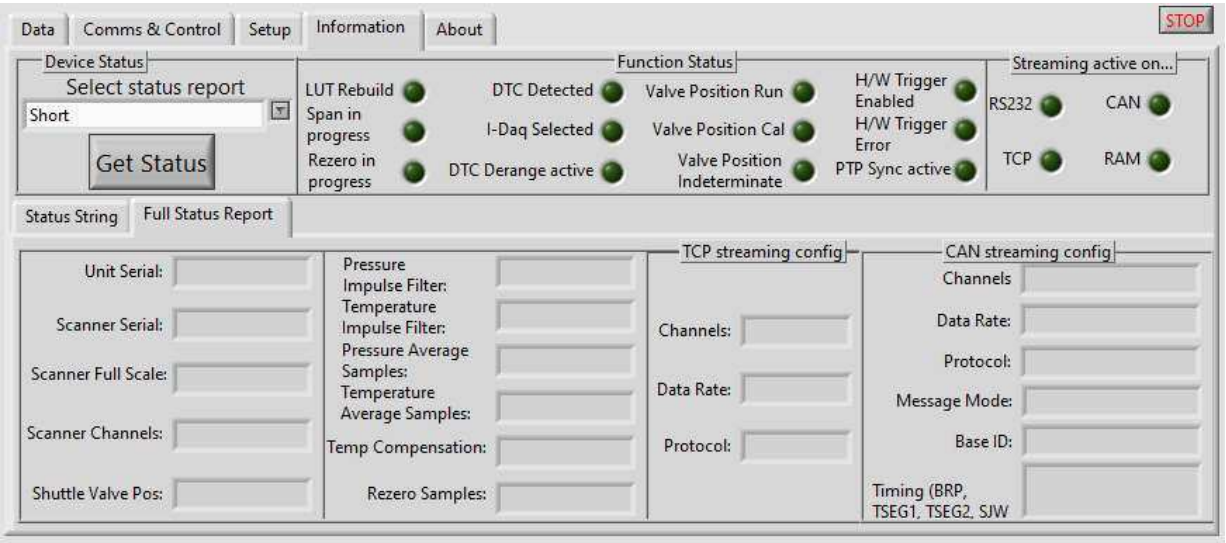


Figure 3.4, The Information Tab.

3.6 About Tab.

The about tab simply shows descriptive information about the version of microDAQX-LV, list of supported and partially supported devices firmware's and some company contact information.