The module of subsystem "Data acquisition" <ICP_DAS>

Module:	ICP_DAS
Name:	ICP_DAS equipment
Type:	DAQ
Source:	daq_ICP_DAS.so
Version:	0.7.3
Author:	Roman Savochenko
Translated:	Maxim Lysenko
Description:	Provides support for ICP DAS hardware. The support of I-87000 and I-7000 DCON modules and I-8000 fast modules is included.
License:	GPL

Contents table

Introduction

The module provides the OpenSCADA system with the support of various equipment of ICP DAS company (http://www.icpdas.com/, http://ipc2u.ru/) through the API library of company *libi8k.a*. Most of the equipment of the ICP DAS company is working under the DCON protocol, but some new equipment such as I-8000 Series operates on a parallel bus, while another part is set into the parallel bus slots of I-8000 which are available under the serial interface and DCON protocol, they are not addressed directly and require call of the specialized command of the slot selection. Access to equipment that uses direct requests under the DCON protocol, can be implemented by the module *DAQ.DCON*. Support for the rest of the equipment is not added to the module *DAQ.DCON*, but it was implemented in this module due to the availability of API library of the ICP_DAS company only for the x86_32 platform, which brings restrictions on access to the equipment of the ICP DAS company and other equipment under the DCON protocol on the other hardware platforms.

The reason for creating this module was the works with the controller LP-8781 of LinPAC series of ICP_DAS company with the purpose to implement runtime PLC based on the OpenSCADA system.

API library of the ICP_DAS company (libi8k.a) is available with source code of the module and does not require separate installation.

1. Data controller

To add the ICP DAS data source the controller is created and configured in the OpenSCADA system. Example of the configuration tab of the controller of this type is shown in Figure 1.
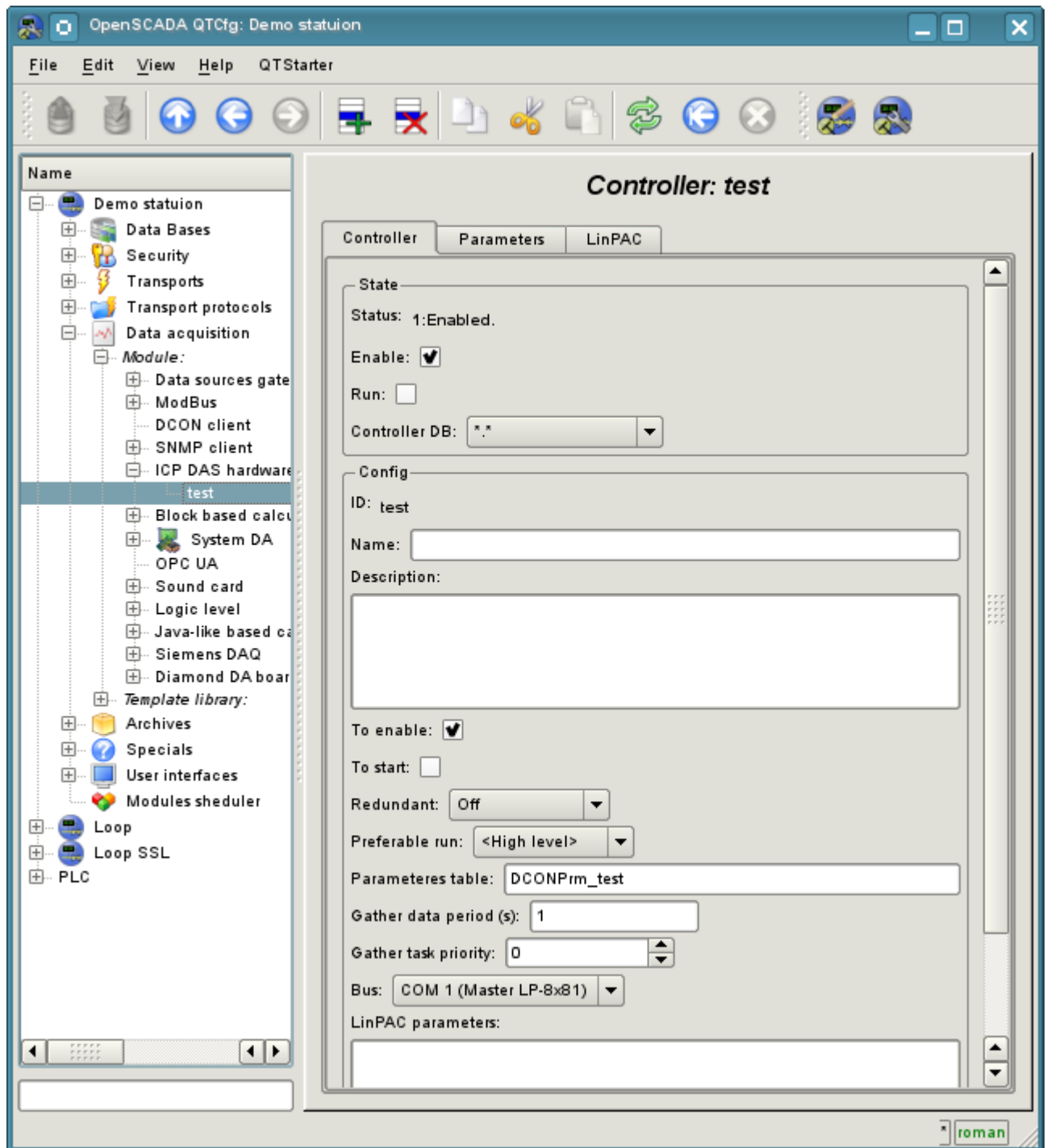

Fig.1. Configuration tab of the controller.

From this tab you can set:
- State of the controller, namely: the status, "Enable" and "Run" and the name of the database containing the configuration.
- Id, name and description of the controller.
- The state, in which the controller must be translated at boot: «To enable» and «To start».
- Horizontal mode of redundancy and performance preference of the controller.
- Name of table to store the configuration of the parameters of the controller.
- The period and the priority of the task of data acquisition.
- Bus, on which the modules are placed. If you specify a serial interface (COMx), then access is

made under the protocol DCON. If the main controller bus is LP-8x81 the access is made through the parallel bus API or mixed.
• Parameters LinPAC. Wrapped to XML generic parameters of PLC family LinPAC. In generic cases this field don't edited manual and edited into.
• Data transfer rate for the serial interface. It is indicated for the not main bus.
• Serial request's tries.

2. Parameters

Module provides only one type of parameters - "Standard". On the parameters tab you can set:
• The state of the parameter, namely the type and the status "Enable"
• Id, name and description of the parameter.
• The state, in which the parameter must be translated at boot: "To enable".
• Type of the input-output module.
• Address of the I/O module, in the case of work not on the main bus - in the decimal value from 0 to 255.
• Slot of the module in the case of work with a series of devices I-8000.
• More options of the module. It is used not by all the modules and contains the text in XML. Not intended for manual editing, and is formed on the Configuration tab, which is usually specific to the each type of modules.
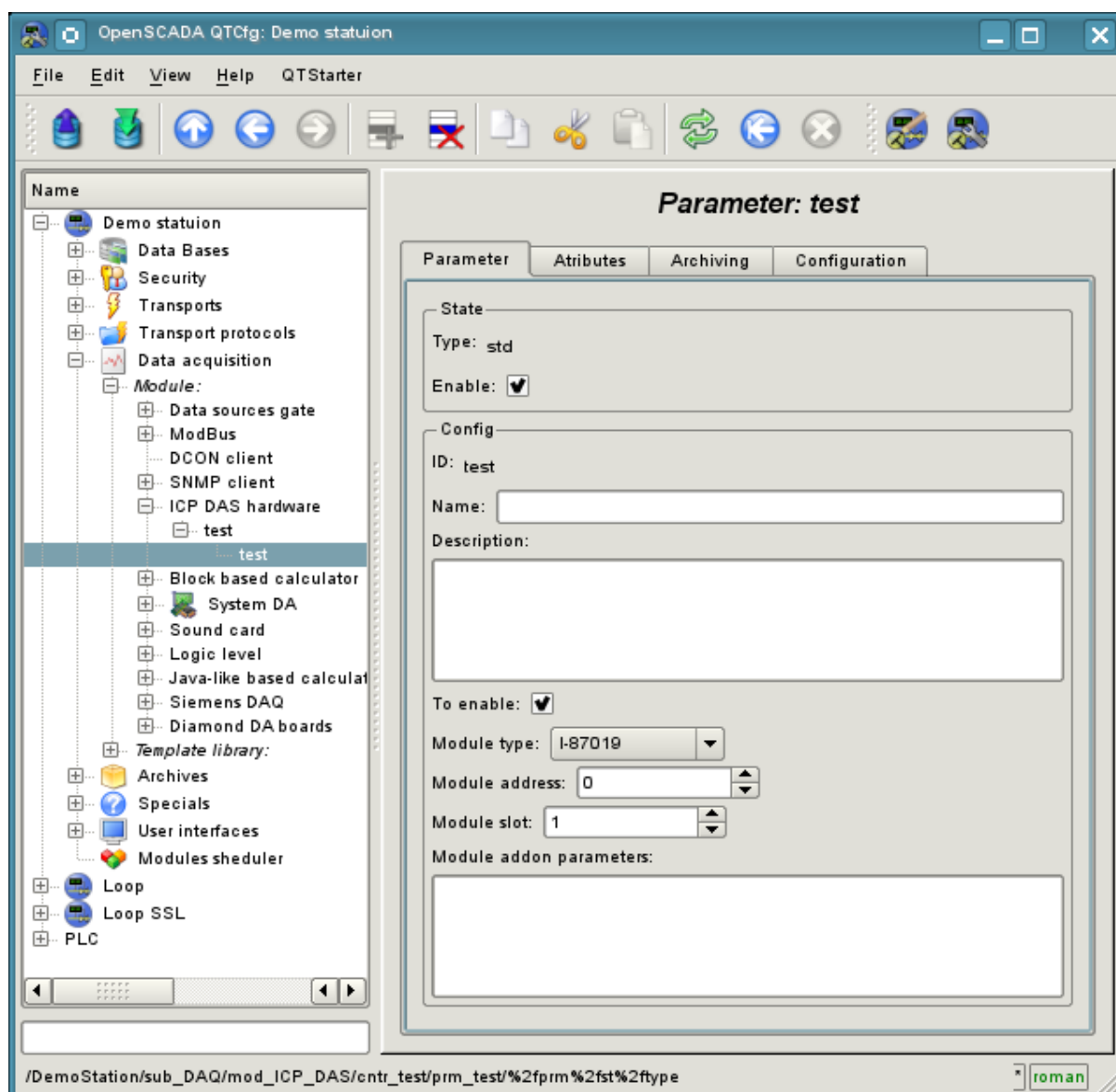

Fig.2. Configuration tab of the parameter.

In accordance with the parameter settings the poll and the creation of attributes is made (Fig. 3).
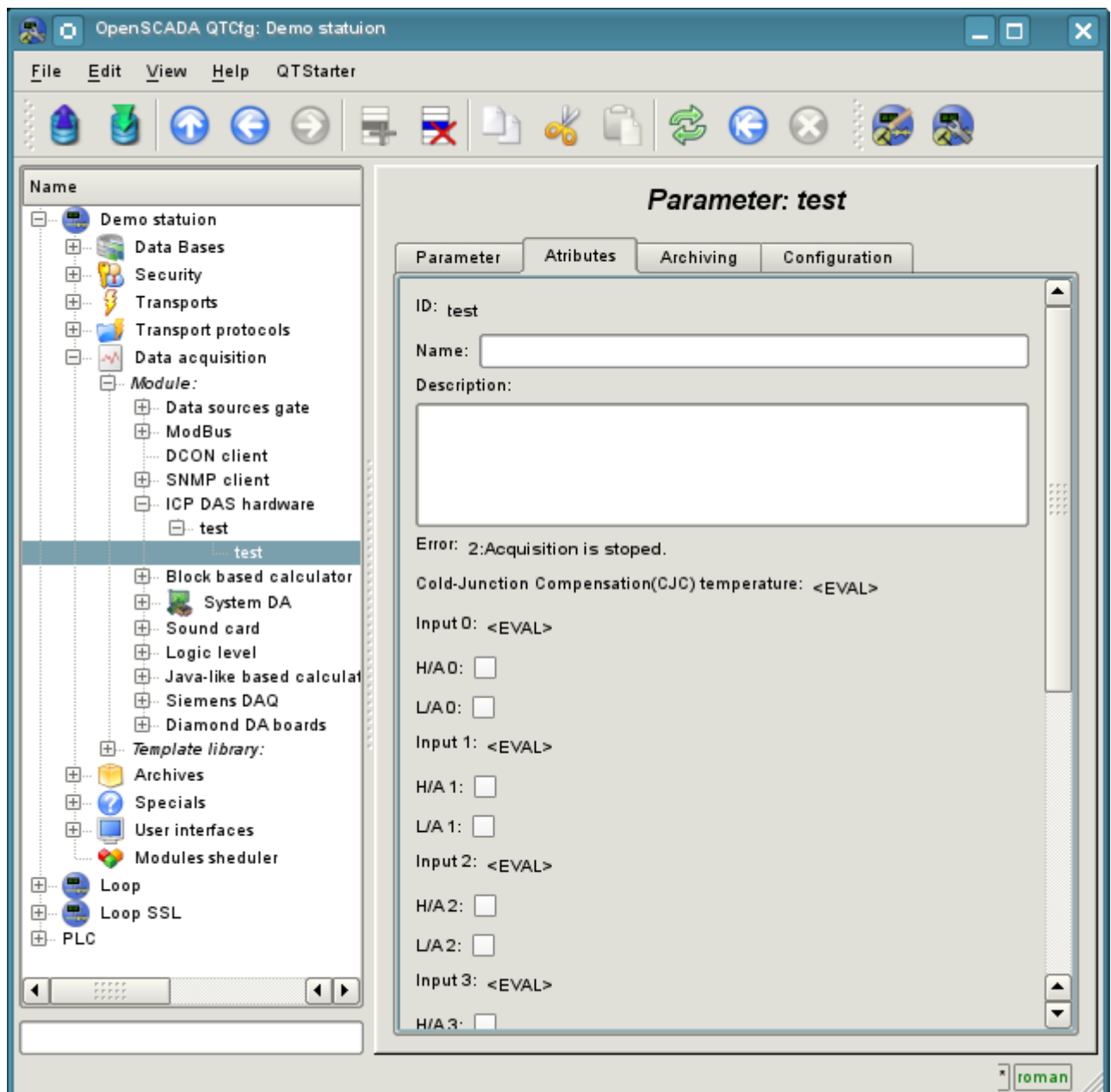

Fig.3. Tab of the attributes of the parameter.

2.1 Module I-8017

Fast analog input module that runs on a parallel bus. Provides speed access to data on one channel at 130 kHz. However, because of the pledged hardware limitations it does not allow to reach speed over 33 kHz per channel when scanning multiple channels. Data expectation is in the blind cycle, which leads to great losses of the CPU at high frequencies of the acquisition.

Module provides eight analog input attributes i{x} and eight signs of violation of the upper ha{x} and the lower la{x} boundaries. Also the configuration tab is available with advanced configuration:
   • *Number of processed parameters* – indicates how many inputs to process. It is characteristic for the mode of fast data acquisition and used to limit the number of processed channels, commensurate with used resources of the CPU.
   • *Frequency of the fast data acquisition (seconds)* – indicates how often to carry out fast data acquisition for the number of channels listed above. Fast mode of data acquisition is turned off by indicating zero period.
   • Modes of the gain for each input define a the following gains: +-1.25V, +-2.5V, +-5V, +-10V and +-20mA.

2.2 Module I-8042

Fast digital input/output module works on a parallel bus. Provides 16 attributes for input i{x} and 16 for the output o{x}.

2.3 Module I-87019

The module of the analog input for the eight channels works on the serial bus and accessible under the DCON protocol. Provides eight analog input attributes i{x} and eight signs of violation of the upper ha{x} and the lower la{x} boundaries. The module provides temperature measurement of cold junctions of thermocouples.

Module provides the tab "Configuration" with the advanced configuration of modes of inputs: +-15mV, +-50mV, +-100mV, +-150mV, +-500mV, +-1V, +-2.5V, +-5V, +-10V +-20mA, J type, K type, T type, E type, R type, S type, B type, N type, C type, L type, M type, L type (DIN43710C).

2.4 Module I-87024

Analog output module for the four channels working on the serial bus and accessible under DCON protocol. Provides four analog output attributes o{x}.

In addition it include tab "Configuration" with configuration host watchdog and output values which set at enable and reset by watchdog.

2.5 Module I-87057

Digital output at 16 channels working on the serial bus and accessible under DCON protocol. Provides 16 diskret outputs o{x}.

In addition it include tab "Configuration" with configuration host watchdog and output values which set at enable and reset by watchdog.

3. LP-8x81 series controllers configuration

For common properties the controllers series LP-8x81 configuration allowed accordingly tab on module's page, where you can get information about controller's serial number, SDK version and DIP-switch value, and also set value for controller's watchdog timer. The watchdog timer is disabled by set it to zero value. Watchdog timer's value updated into controller's task and with it period. The acquisition task hang consequently follow controller's restart!

Links

Special modules for Linux kernel 2.6.29 for controllers LP-8x81: lp8x81_2629.tgz

The driver from VIA for controllers LP-8x81 network: rhinefet20070212111037.tgz

On standard Linux network driver the speed is droped significant after days work

The patch for build network driver for Linux 2.6.29: build_2.6.29.patch