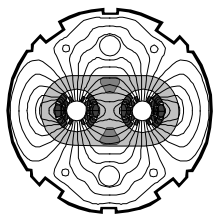


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the
**Large
Hadron
Collider**
project

LHC Project Document No.

LHC-UNICOS

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FUNCTIONAL SPECIFICATION

INTEGRATION OF NON UNICOS DEVICES INTO THE UNICOS ENVIRONMENT

Abstract

This document describes how to integrate non UNICOS devices like JCOP devices into the UNICOS environment.

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1. INTRODUCTION

1.1 PURPOSE OF THIS DOCUMENT

This document describes how to use non UNICOS devices into the UNICOS environment. An example based on a JCOP device is given to show how to use the import and the trending features.

1.2 DEFINITIONS, ACRONYMS AND ABBREVIATIONS

- UNICOS: UNified Industrial COntrol System.
- unicos-pvss.x.y.y: version of the unicos-pvss package.
- DS: UNICOS Data Server, a computer running a PVSS project (PVSS managers: Event Manager, Database manager, etc.).
- OWS: UNICOS Operator WorkStation, a computer running one (or many) PVSS graphical interface.
- Application: set of DS and PVSS projects.
- DP: PVSS data point type.
- DPTYPE: PVSS data point type.

1.3 PRE-REQUISITE

1. PVSS 3.6 SP2.
2. unicos-4.2.7
3. UNICOS project with the following components installed: fwCore, fwAccessControl, fwTrending and unCore

2. DESCRIPTION

Two types of device exist in the UNICOS environment: device and front-end device. A device belongs to one and only one front-end device and a front-end device can have many devices.

A device in the UNICOS environment must have as at least a root DPE: 'ProcessInput' of type struct. Some device information is stored in the 'ProcessInput' description. The 'ProcessInput' struct can contain DPE of any type and any depth. There is no such constraint on front-end device.

Any other type of devices like the JCOP ones can also be integrated into the UNICOS environment and be considered as UNICOS devices. Utilities like UNICOS trending and faceplate trending can be used with non UNICOS devices via a UNICOS proxy link. The integration of a non UNICOS device is done by a proxy link: a DPE named proxy at the root level of the UNICOS device DP structure and of type 'dyn_string' (Figure 1, Figure 2). A UNICOS device and front-end device must be created and must contain at least the proxy link. Any proxy device DPE can be trended in faceplate, in dynamic trending and in Single DPE trending utilities.

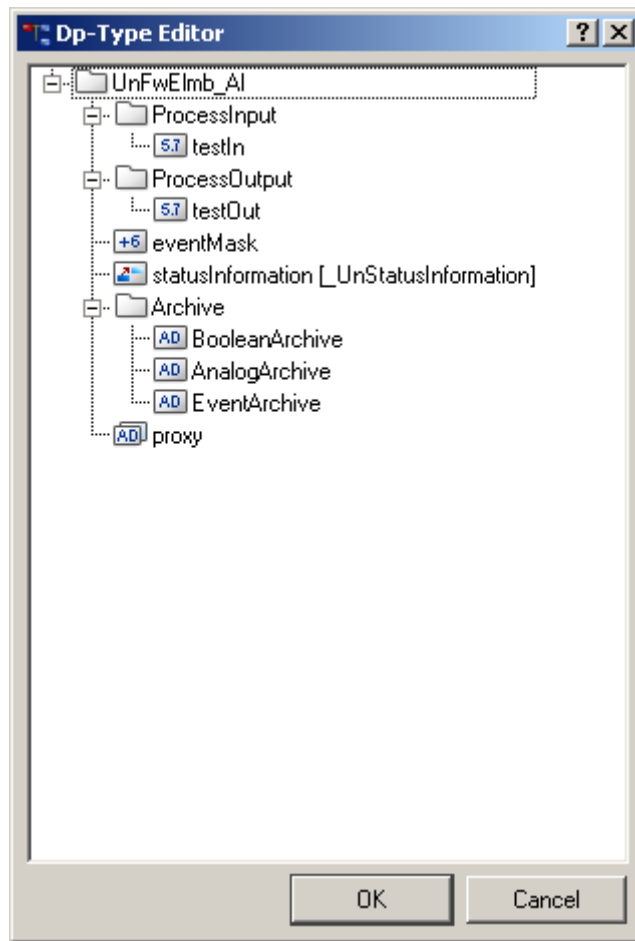


Figure 1: UNICOS device with the proxy link.

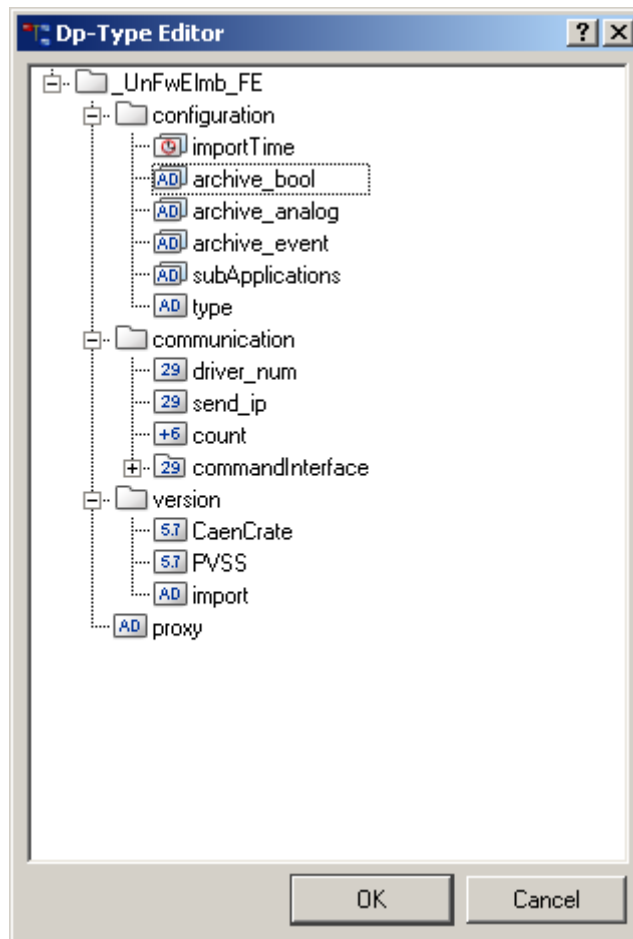


Figure 2: UNICOS front-end device with the proxy link.

The following sections describe:

1. the UNICOS device and front-end device type structure to accept proxy link: Section 3
2. how proxy devices can be taken in account for the archive size check phase of the UNICOS import utility: Section 4
3. how proxy devices data can be shown in the widget and faceplate: Section 5
4. how to configure the UNICOS trending DPE list: Section 6.1, for dynamic and single DPE trend: Section 6.2 and faceplate trending: Section 6.3

3. INTEGRATION OF NON UNICOS DEVICES

To use any other type of devices in the UNICOS world, a UNICOS device or a UNICOS front-end device must be created. This device will act as a proxy device and will be the link between the device and the UNICOS utilities: trending, import, widget, faceplate, etc.

3.1 DEVICE TYPE STRUCTURE

The UNICOS device type (Figure 1) or front-end device type (Figure 2) must have a root DPE named 'proxy' of DPE type dyn_string.

3.2 DEVICE TYPE CONFIGURATION

The list of proxy device type must be set for the UNICOS device type:

1. open the Device Internal Configuration
2. configure the list of proxy device type for the UNICOS device (Figure 3) or the front-end UNICOS device (Figure 4)

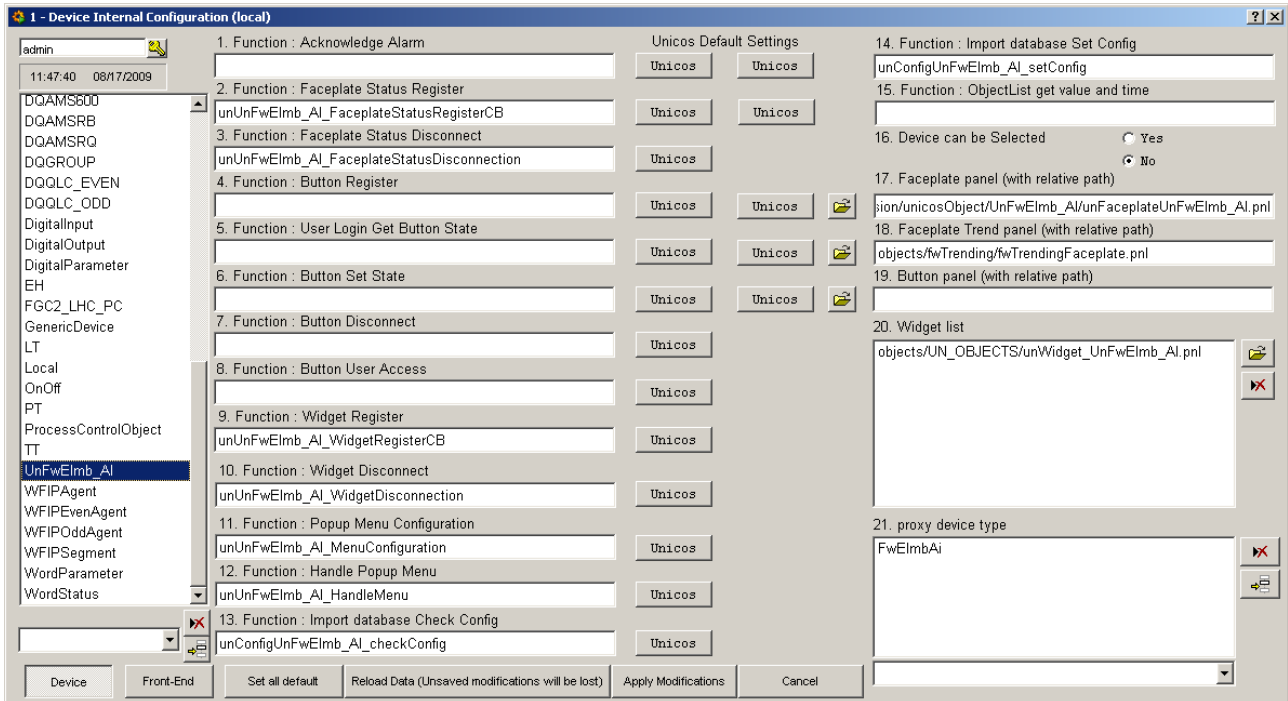


Figure 3: UNICOS of proxy device type configuration.

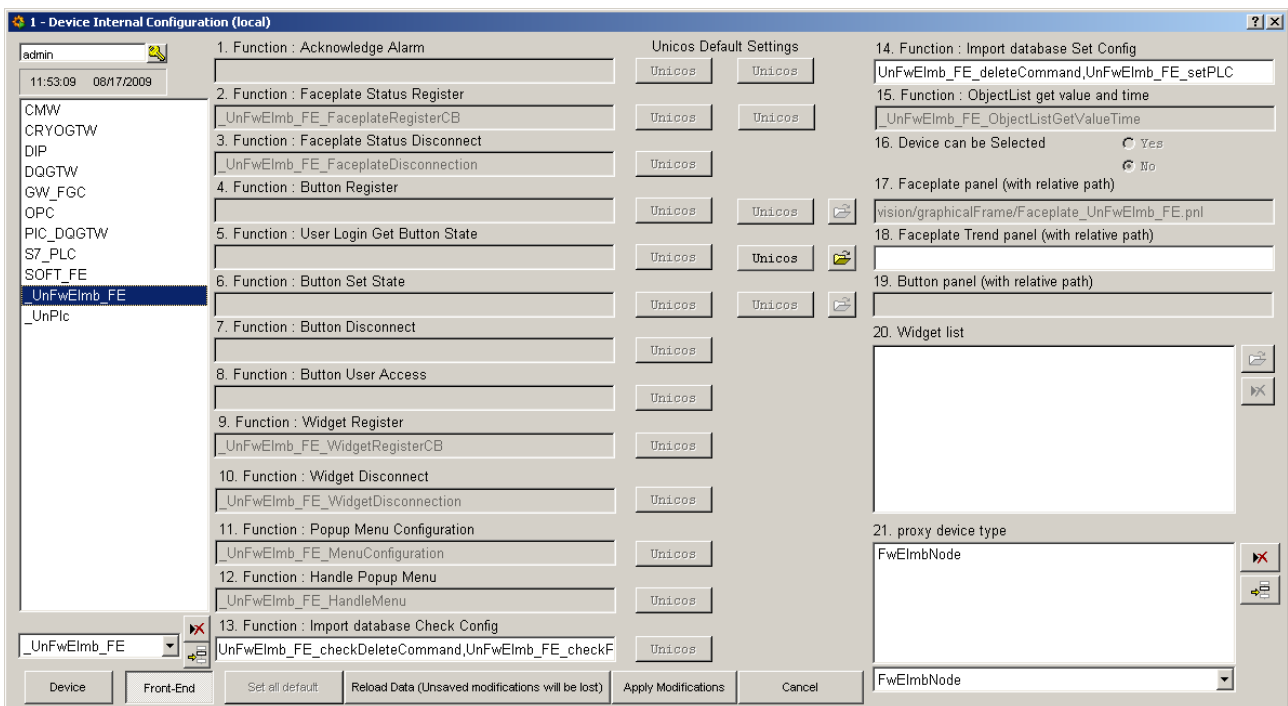


Figure 4: Front-end UNICOS of proxy device type configuration.

4. IMPORT UTILITY

The UNICOS device import utility is able to take in account the list of proxy DPE for the archive checking phase in order to prevent the import if there is not enough free space in the archive. The following function must exist:

- For the UNICOS front-end device type a function named 'FrontEndDeviceType_getArchiveProxyDPE'. This function must return a dyn_dyn_string with the list of proxy DPE linked (or that will be linked) to the front-end for the three archives: boolean, analog and event. See below the example for the _UnFwElmb_FE front-end device: _UnFwElmb_FE_getArchiveProxyDPE.
- For the UNICOS device type a function named 'DeviceType_getArchiveProxyDPE'. This function must return a dyn_dyn_string with the list of proxy DPE linked (or that will be linked) to the front-end for the three archives: boolean, analog and event. See below the example for the UnFwElmb_AI device: UnFwElmb_AI_getArchiveProxyDPE.

```
dyn_dyn_string _UnFwElmb_FE_getArchiveProxyDPE(dyn_string dsConfigLine)
{
    dyn_dyn_string dds;

    //return here for the boolean archive the list of proxy DPEs linked to the front-end
    dds[UN_CONFIG_ADDITIONAL_ARCHIVE_BOOL] = makeDynString();
    //return here for the analog archive the list of proxy DPEs linked to the front-end
    dds[UN_CONFIG_ADDITIONAL_ARCHIVE_ANALOG] = makeDynString();
    //return here for the event archive the list of proxy DPEs linked to the front-end
    dds[UN_CONFIG_ADDITIONAL_ARCHIVE_EVENT] = makeDynString();

    return dds;
}
dyn_dyn_string UnFwElmb_AI_getArchiveProxyDPE(dyn_string dsConfigLine)
{
    dyn_dyn_string dds;

    //return here for the boolean archive the list of proxy DPEs linked to the device
    dds[UN_CONFIG_ADDITIONAL_ARCHIVE_BOOL] = makeDynString();
    //return here for the analog archive the list of proxy DPEs linked to the device
    dds[UN_CONFIG_ADDITIONAL_ARCHIVE_ANALOG] = makeDynString();
    //return here for the event archive the list of proxy DPEs linked to the device
    dds[UN_CONFIG_ADDITIONAL_ARCHIVE_EVENT] = makeDynString();

    return dds;
}
```

5. WIDGET & FACEPLATE

In the widget and faceplate the proxy device data can be shown. For the widget the the device name (alias, it can be converted to the device DP name by the function

unGenericDpFunctions_getWidgetDpName) is given and for the faceplate the device DP name is given, therefore the proxy device list and proxy device data can be read or set.

6. TRENDING

The list of DPEs for the three types of trending can be configured for the UNICOS device and UNICOS front-end device:

- List of DPEs for the dynamic and single DPE trending Section 6.2
- List of DPEs for the faceplate trending Section 6.3

Only the DPE of type: int, float, uint and bool can be trended:

6.1 CONFIGURATION OF THE DEVICE DPE LIST

1. Open the Device Trend Configuration for Device (Figure 5) or Front-End (Figure 6)
2. Configure the list of proxy device type DPE for dynamic and single DPE trending by transferring the DPE from the 'DPE List' table to the 'Trendable DPE' table. DPE with '→' means proxy DPE, the left part is the proxy device type and right part the leaf DPE. Both device DPE and proxy device DPE can be trended. The range DPE can be either a device DPE or a proxy DPE. The following rule is applied to find the DPE range:
 - if the DPE is a device DPE and the range DPE is a device DPE, the configured device range DPE will be used
 - if the DPE is a device DPE and the range DPE is a proxy device DPE, the range DPE will be the first proxy device DPE of same type as the range proxy device DPE found in the list of proxy
 - if the DPE is a proxy device DPE and the range DPE is a device DPE, the configured device range DPE will be used
 - if the DPE is a proxy device DPE and the range DPE is a proxy device DPE of the same type, the range DPE will be the corresponding proxy device range DPE
 - if the DPE is a proxy device DPE and the range DPE is a proxy device DPE of a different type, the range DPE will be the first proxy device DPE of same type as the range proxy device DPE found in the list of proxy

If the range DPE has a pv_range config, the pv_range min/max will be used as min/max scale of the curve, if the range DPE has not a pv_range config, the curve will be in autoscale.

3. Configure the list of proxy device type DPE for faceplate trending by transferring the DPE from the 'DPE List' table to the 'Faceplate Configuration' DPE list. This DPE list will be used for the faceplate trending configuration (Section 6.3). The DPE range and color is obsolete. DPE with '→' means proxy DPE, the left part is the proxy device type and right part the leaf DPE. Both device DPE and proxy device DPE can be trended. If needed, the list of proxy device can be modified via the device configuration (Figure 7) or front-end device configuration (Figure 8).

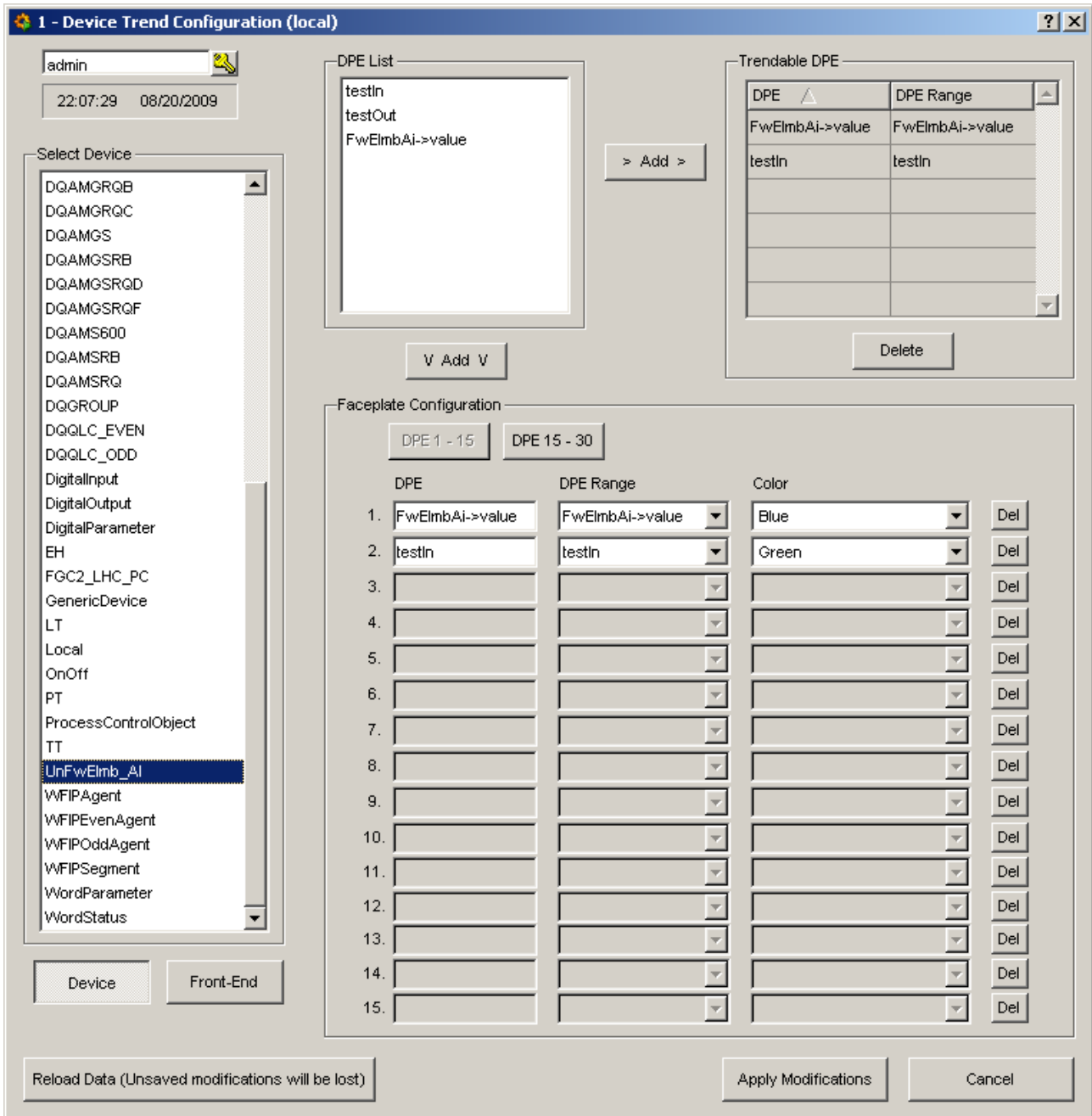


Figure 5: Device trend configuration.

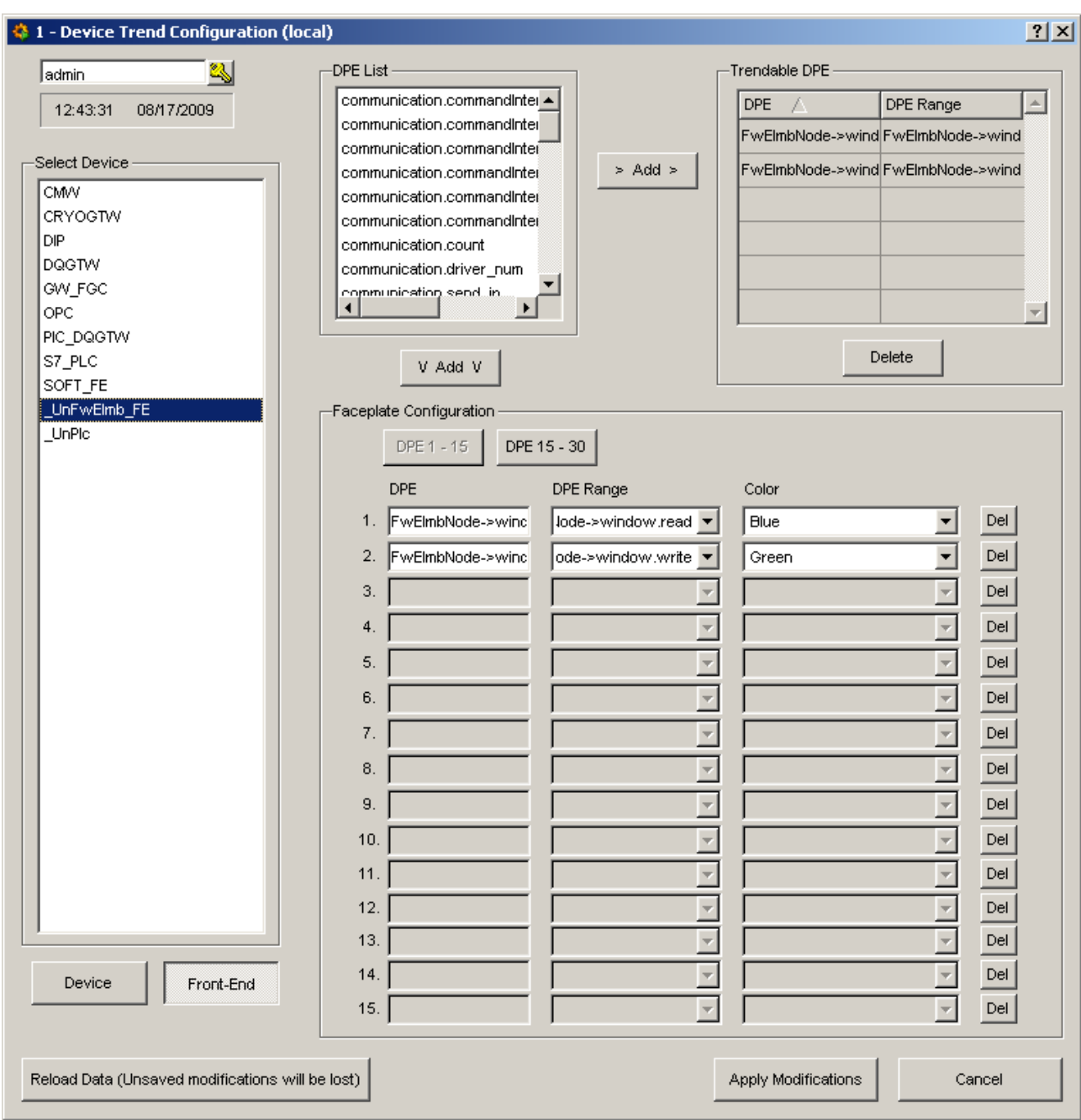


Figure 6: Front-end device trend configuration.

1 - Device configuration (local): UnFwElmb_AI_Jonas15

Device configuration

Device: un:un-ELMB_JONAS_2-JONASap-UnFwElmb_AI-00015

Alias: UnFwElmb_AI_Jonas15

Device link(s):

Description: Analog ELMB Channel 15

Diagnostic: panel_diagnostico.pnl

Synoptic: panel_defecto

Html: www.cern.ch/help/Elmb\A\channel.htm

Domain: DOMINIO

Nature: NATURALEZA

Access control:

Domain list:

Operator action:

Expert action:

Admin action:

Faceplate Trends

DPE	Operator Min	Operator Max
FwElmbAi->value	-9	56
testIn		

Name (PCO, PID):

proxy device list

- ELMB/can00/Elmb_Jonas2/
- ELMB/can00/Elmb_Jonas2/

+UNICOS

+Modify Config

+Modify Config

+Modify Config

Widget list:

- UnFwElmb_AI

DPE	Alias/descrip.	Format	Unit	Range	Alert	Archive	Address	Smoothing
ProcessInput.testIn								
ProcessOutput.testOut								
Archive.BooleanArchive								
Archive.AnalogArchive								
Archive.EventArchive								
proxy								

Reload Data (Unsaved modifications will be lost)

Need to Apply Modifications

Don't need to Apply Modifications

Apply Modifications

Cancel

Figure 7: Device configuration.

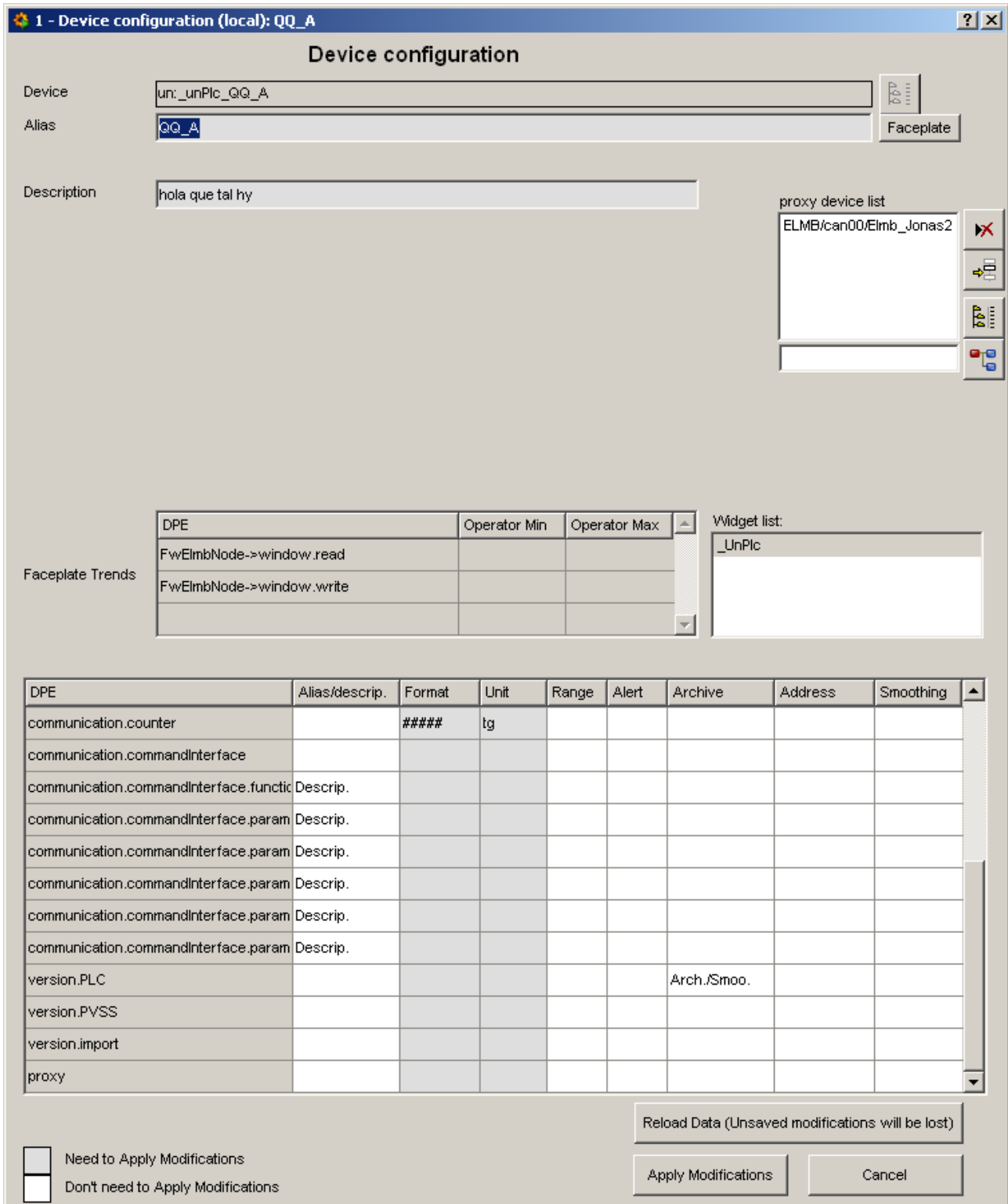


Figure 8: Front-end configuration.

6.2 DYNAMIC TRENDING AND SINGLE DPE TRENDING

As a result of the device DPE configuration, the configured list of device DPE and proxy DPE can be trended via the dynamic trend (Figure 9 and Figure 11) and single DPE trend utilities (Figure 10 and Figure 12).

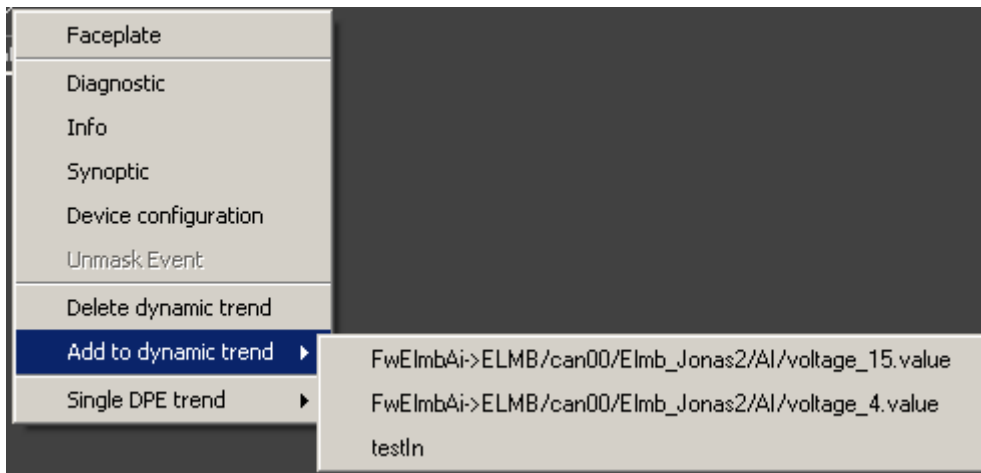


Figure 9: Device Dynamic trend.

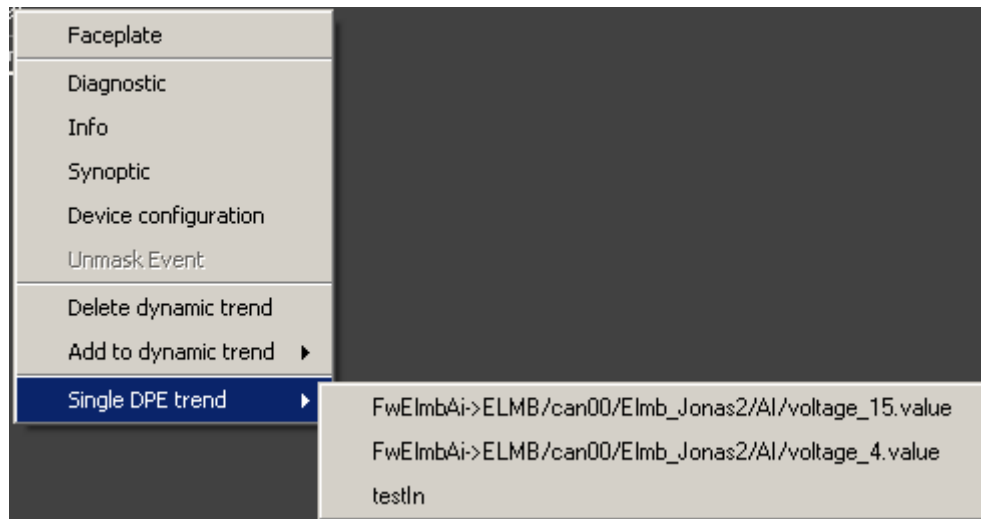


Figure 10: Device Single DPE trend.

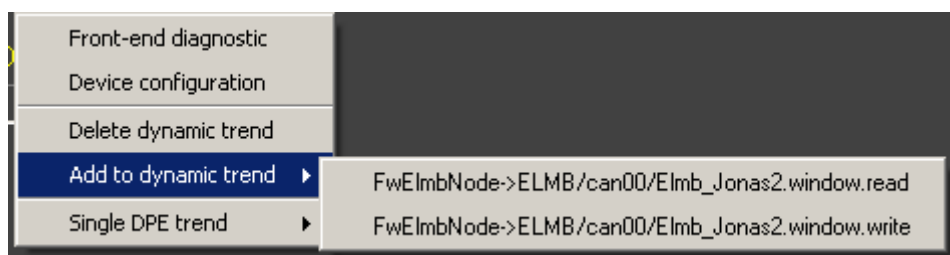


Figure 11: Front-end Dynamic trend.

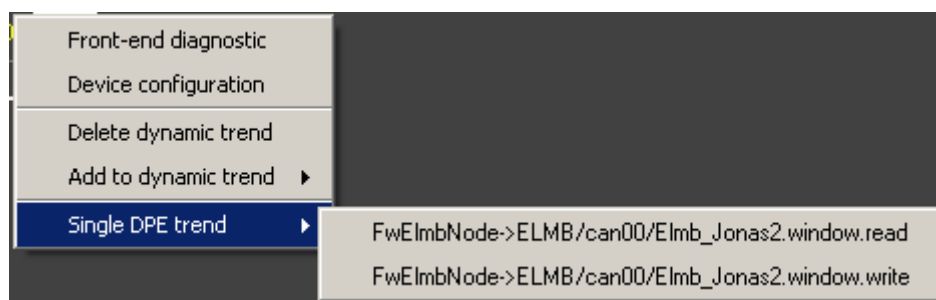


Figure 12: Front-end Single DPE trend.

6.3 FACEPLATE TRENDING

1. Open the Device Faceplate Trend configuration for Device (Figure 13) or for Front-end (Figure 14)

2. For each trend configuration, up to 8 curves DPE can be added. If a proxy DPE is selected, all the corresponding proxy device DPEs will be trended with the same configuration (range, color, min/max, etc.). The same rule as the one described in Section 6.1 will be applied for the range DPE.

If the configured DPE is in the list of Faceplate Trends DPE with a Operator Min and Operator Max value (Figure 7 or Figure 8), the min/max scale of the curve will be the Operator Min and Operator Max, if there is no Operator Min and Operator Max value and the range DPE has a pv_range config, the pv_range min/max will be used as min/max scale of the curve, if there is no pv_range config the configured min/max scale or autoscale will be used instead.

As a result of the faceplate trending configuration, the configured list of faceplate trend can be opened via the faceplate trend utility for Device (Figure 15) or Front-end (Figure 16).

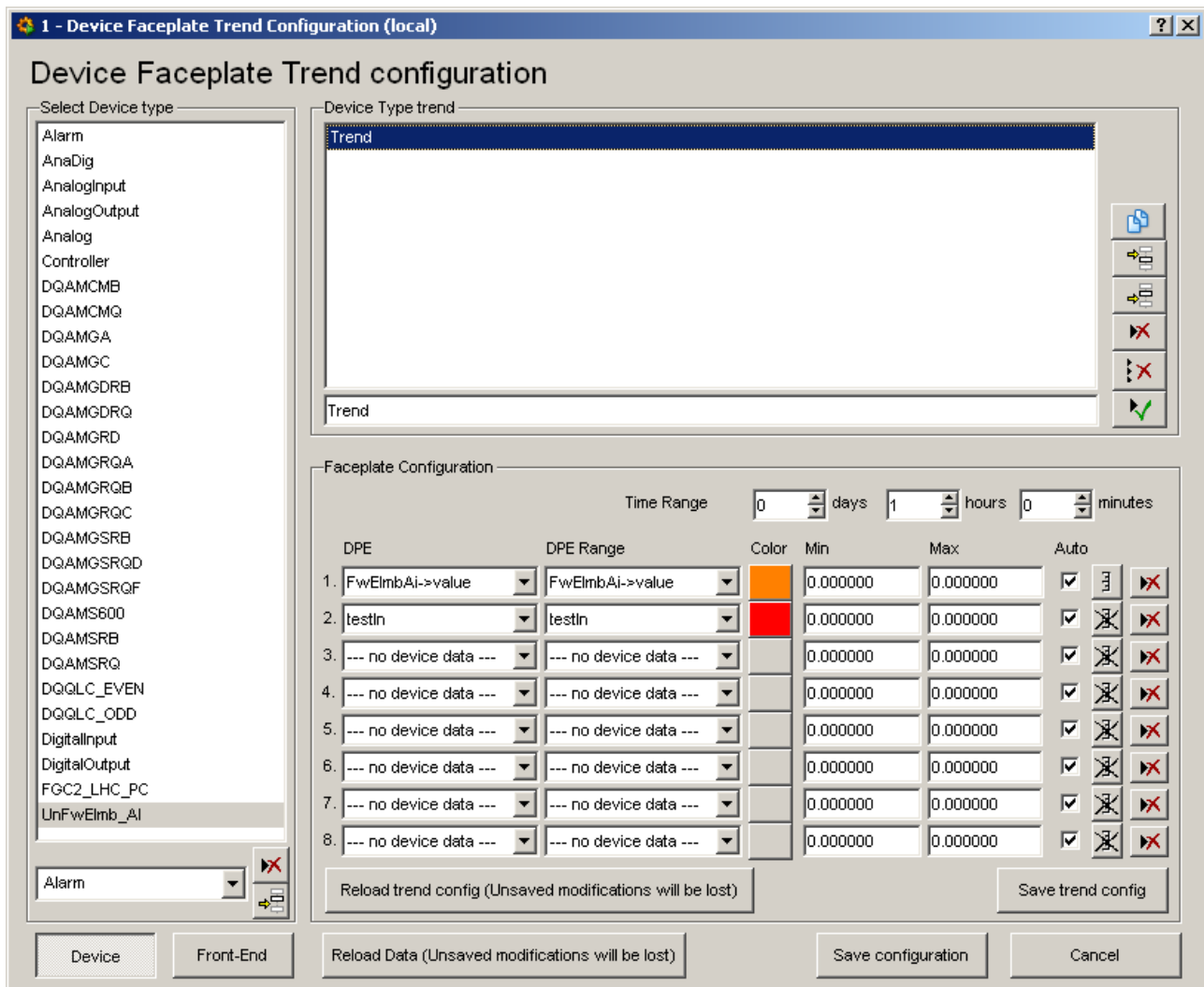


Figure 13: Faceplate trend configuration.

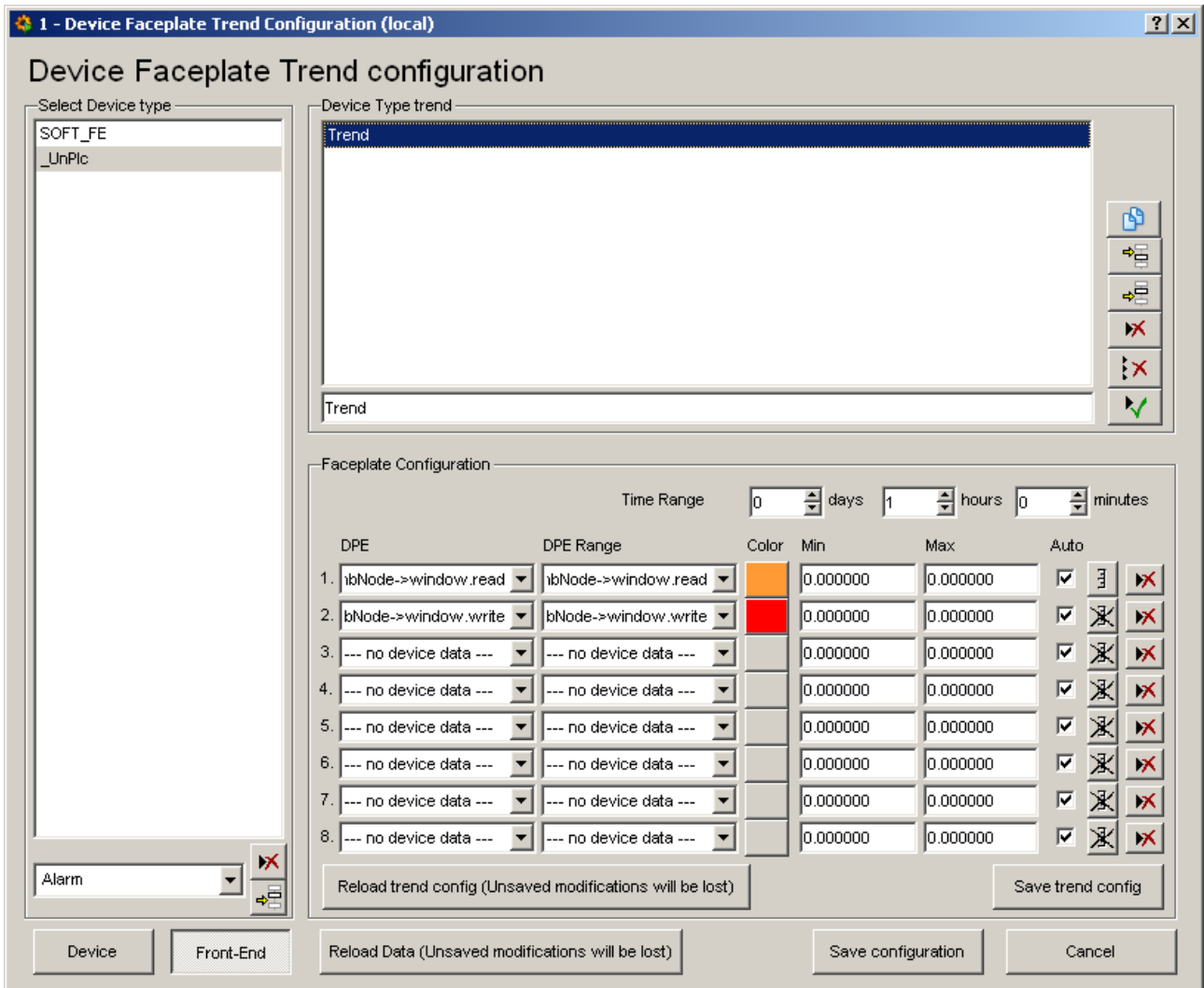


Figure 14: Front-end trend configuration.

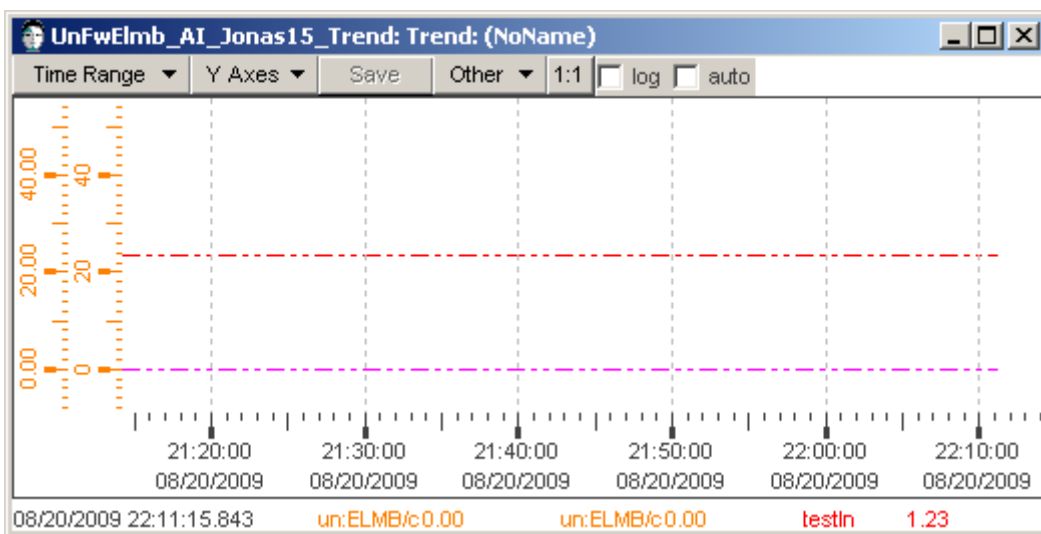


Figure 15: Device faceplate trend.

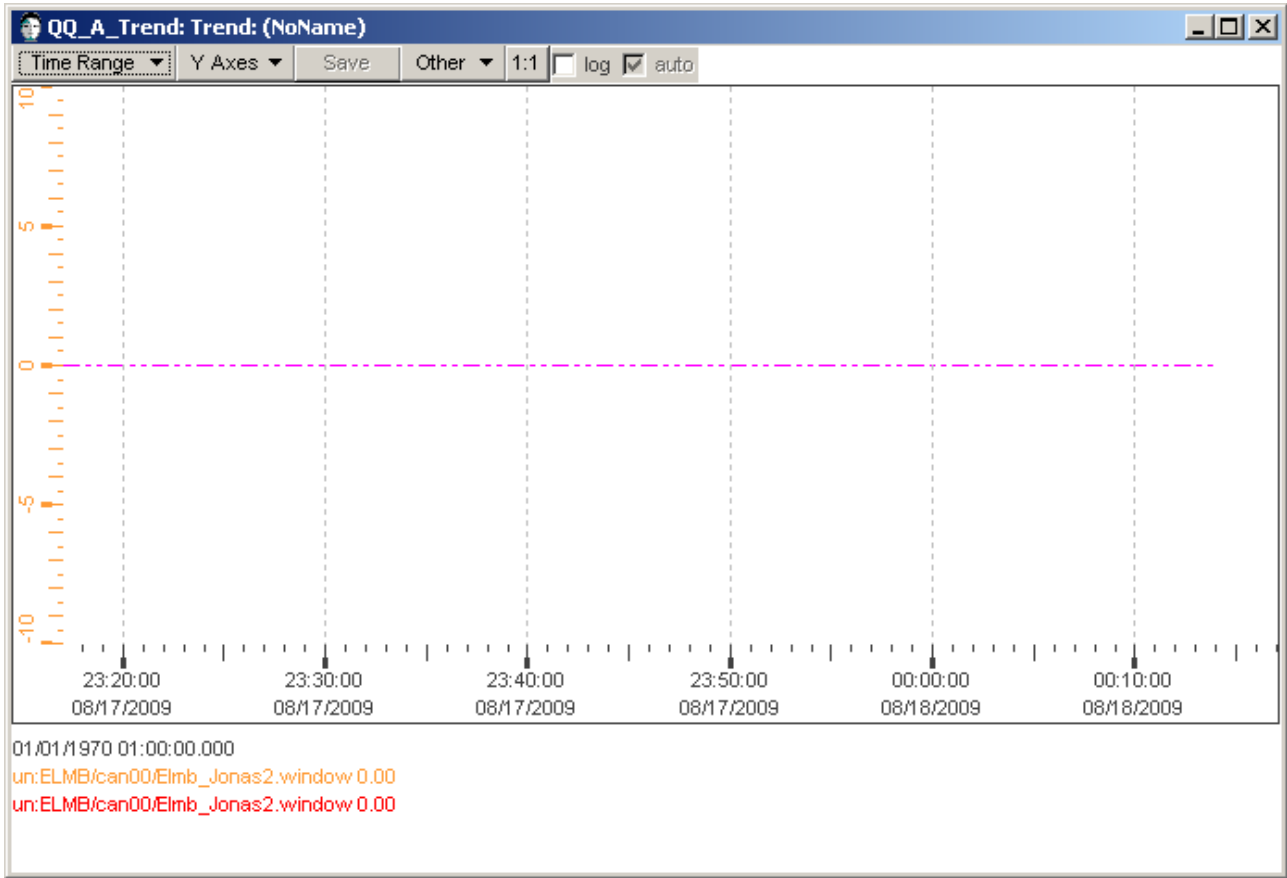


Figure 16: Front-end faceplate trend.

REFERENCE & USEFUL LINK

1. UNICOS: <http://ab-project-unicos.web.cern.ch/ab-project-unicos/>

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