

XDSC Components 3.1.0

USER MANUAL

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i-less

by  **Anomoref**

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A. System Requeriments

To use XDSC Components 3.1.0, you must install LabVIEW 2013 Base, Full, or Professional Development System (32-bit) with LabVIEW 2013 Datalogging and Supervisory Control Module

Supported Operating Systems:

The XDSC Components supports the following operating systems:

- Windows 7 (32-bit and 64-bit)
- Windows Vista (32-bit and 64-bit)
- Windows XP Service Pack 2 or later
- Windows Server 2003 R2 (32-bit)
- Windows Server 2008 R2 (64-bit)



B. XDSC UI. LabVIEW Component to connect LabVIEW DSC PSP shared variables with Front Panel objects



1. Introduction

Nowadays, we have only two options to associate one Front Panel control/indicator with a PSP variable (Publish and Subscribe Protocol):

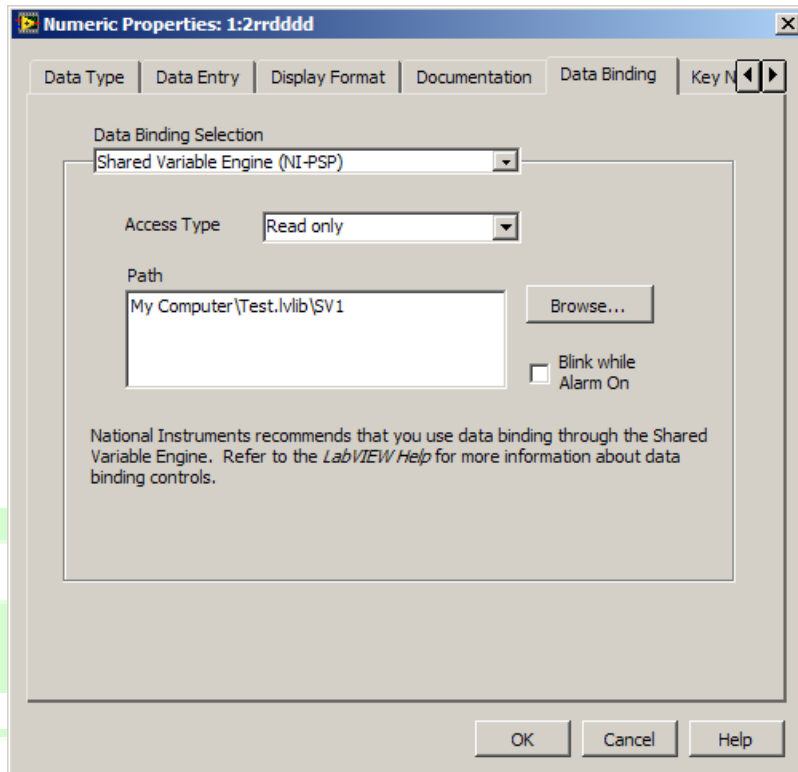


Figure 1. 'Properties'

- Input data write verification in process variables.
- In case of error data input, active undo effect with 'Esc' key.
- Only 'Tab', 'Intro' and 'Return' keys are available in variable input data.
- During variable write process all the operations are not available.
- Initial values are stored in *.lvlib file (in case of shared variables are used as parameters with initial values). If variable configuration has checked 'Initial value' any change in associate control will update its file initial value.

In order to make easier programmers work, we have designed a component based in Xnode technology implemented by LabVIEW.

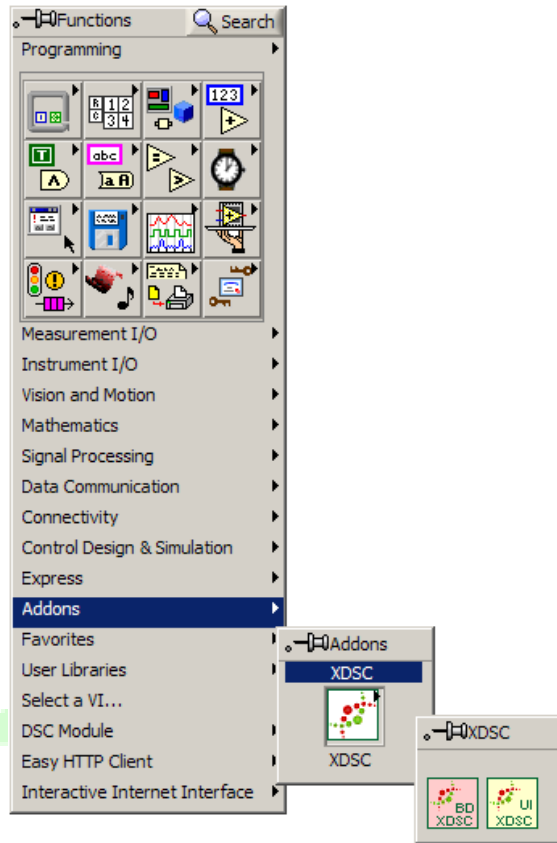
2. Description of the component

Component has been designed to use in write/read mode with the next data types:

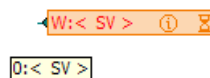
- Double precision floating Numeric (Analog), for Digital Numeric control/indicator classes.
- Booleans (Digitals), for Boolean control/indicator classes.
- Integer Numeric for NamedNumeric and Radio Buttons control/indicator classes.

PSP communication is based in Datasocket API, optimizing system resources through programming by events.

From 'Functions>>Addons>>XDSC>>XDSC UI' palette you can drag the component to drop it in Block Diagram.



Component parts are:



- Information icon, where actual component configuration is associated.
- Left side component terminal, where you can connect the control/indicator reference to be associated ('Tip' shows the variable reference which has been associated).

3. Features in edit mode

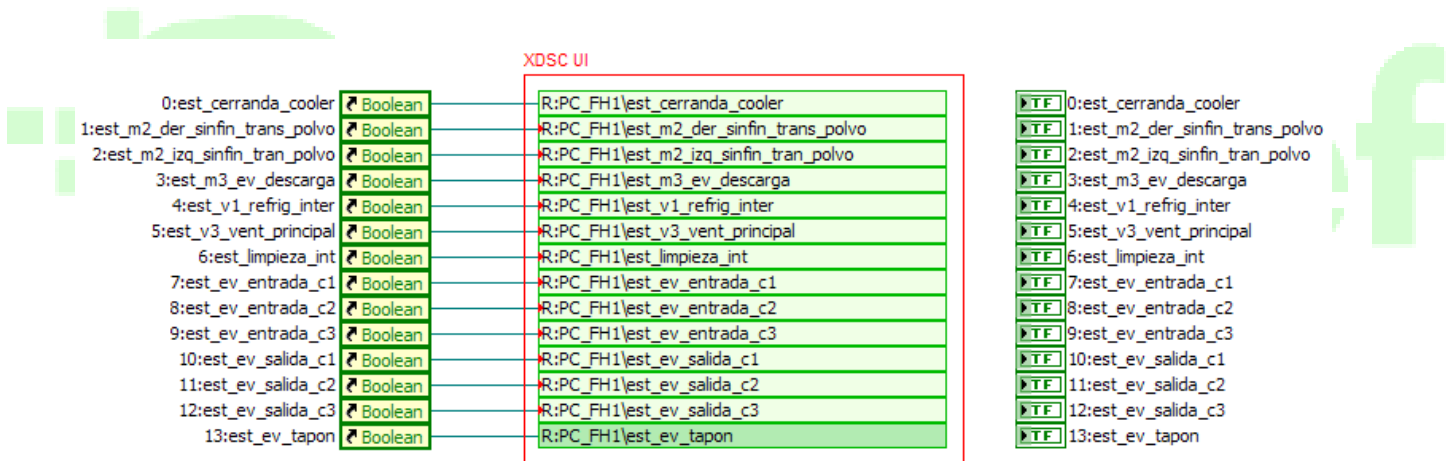
The most important Edition Mode Characteristics are:

- 'Automatic Tool Selection'

We have designed a central zone where 'Operate Value' has been activated, two lateral zones for 'Position/Size/Select' tool in order to move and resize activation and terminal zones where connect control references.

- 'Drag&Drop'

You can add new variables to component dragging them from variable lib, one by one or several at the same time. Each variable is identified by its URL 'mode:process\variable_name' ('R': read, 'W': write/read) data type (Green: 'Boolean', Orange: 'Numeric', Blue: 'NamedNumeric' and 'Radio Buttons') are automatically assigned. In order to associate any control or indicator to variable, you can just select the variable item in the component you want to associate, and drag the icon control from the block diagram over the XDSC UI object to auto link the control with the shared variable.



When you establish the link, a control reference is automatically generated, control/indicator is renamed with 'i:variable_name' (i: index inside component), and the reference created by the component and the control/indicator are sorted in the diagram.

- 'Resize'
Component can be resized dragging up/down, letting up to 25 elements by component. If the size is reduced the components which disappear are eliminated.

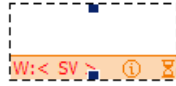


Figure 3. 'Resize Feature'

- 'DoubleClick'
Making double click over a specific element can modify associated properties.

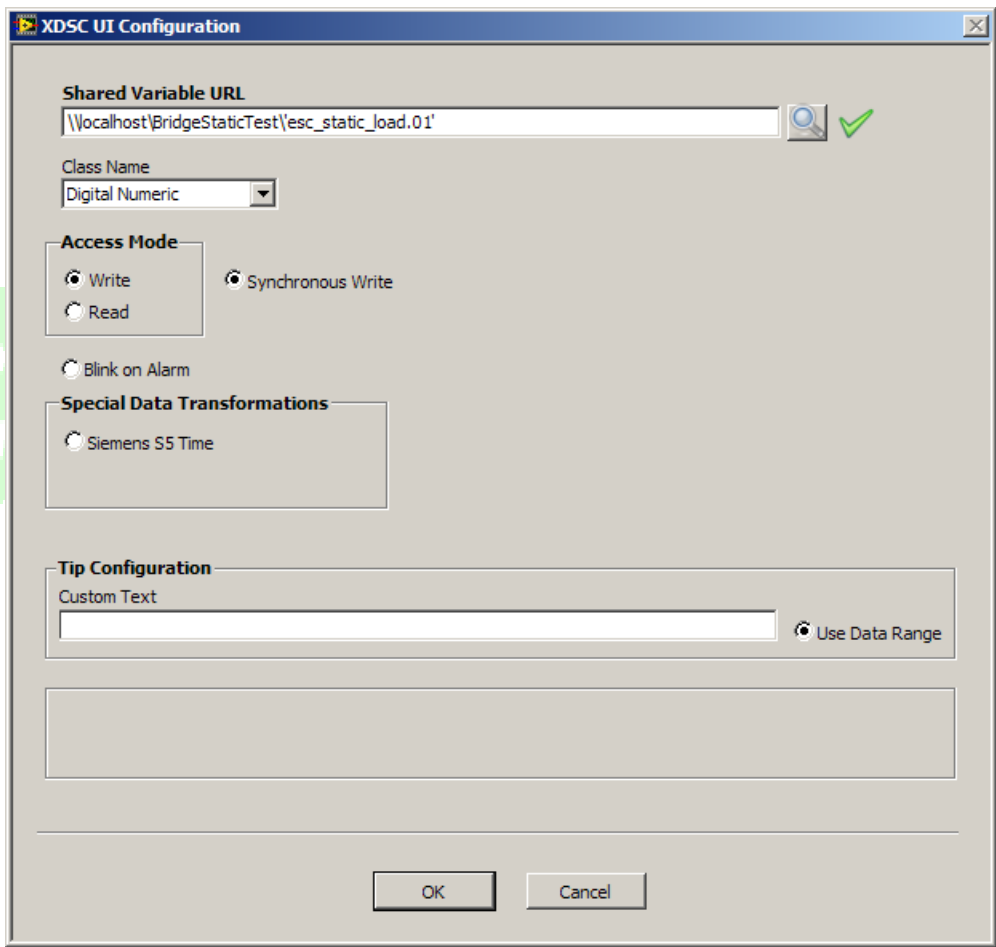
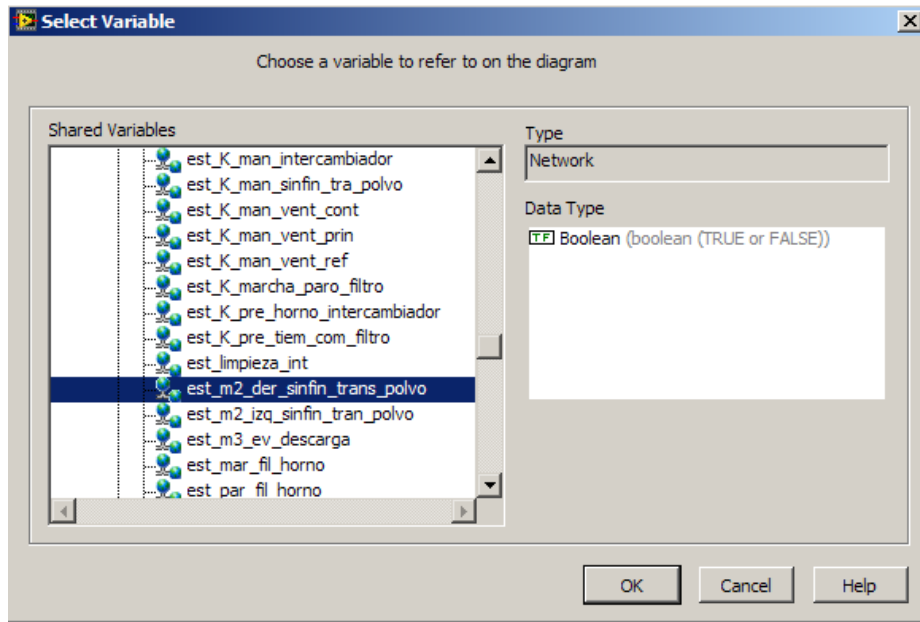


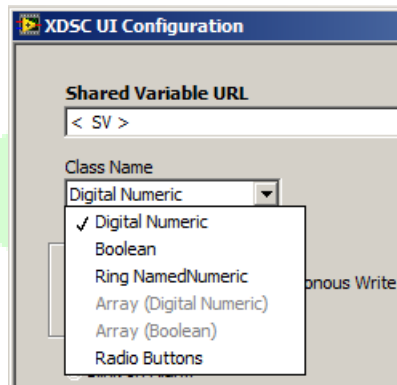
Figure 4. 'DoubleClick Feature'

Configuration panel includes next elements:

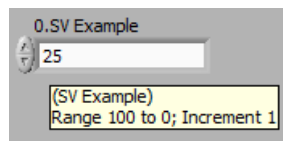
- 'Shared Variable URL': Complete URL of selected variable. Let introduce a new variable manually. URL is checked automatically if exists or not, activating or not the checkmark indicator.



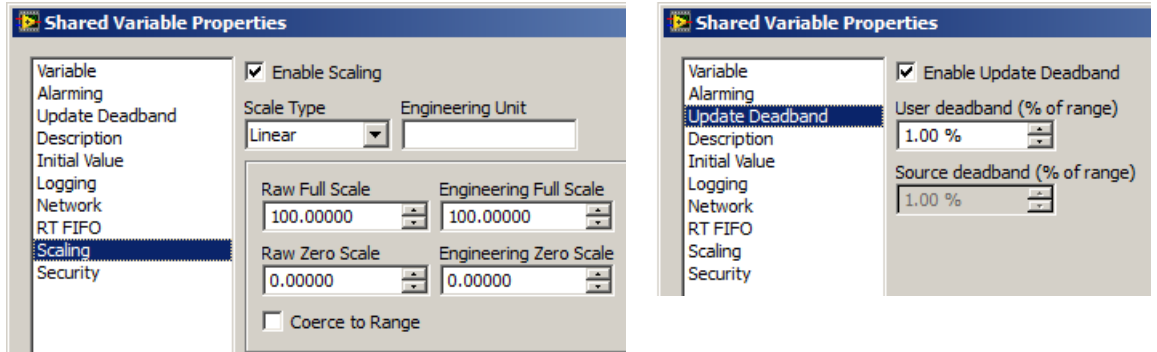
- 'Class Name': Data associated type. It will be assigned automatically, but it can be modified manually.



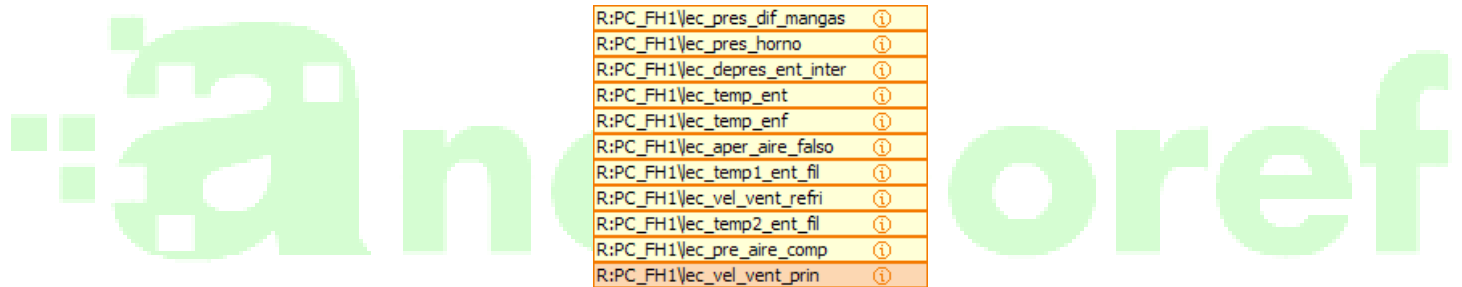
- 'Tip Configuration': Help message associated to control/indicator when 'Digital Numeric' data type is selected. It appears when mouse is over the control/indicator for few seconds. 'Custom Text' value is shown; if 'Use Data Range' option is selected, according with the shared variable configuration, it will be shown:



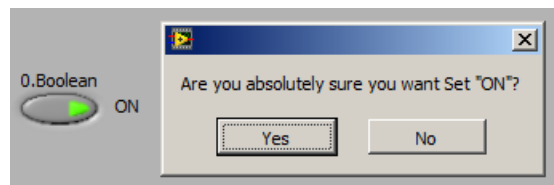
where '0' is the *Engineering Zero Scale* value defined in *Scaling* shared variable feature; '100' is the *Engineering Full Scale* value defined in *Scaling* shared variable feature; '1' is the increment value calculated using value set in *Source deadband*, *Engineering Full Scale* and *Engineering Zero Scale* values.



In the icon component symbol ⓘ is shown.

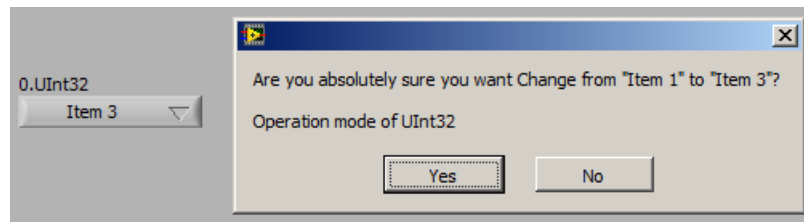


- 'Boolean Operation Configuration': Confirmation message associated to 'Boolean', 'Ring NamedNumeric' and 'Radio Buttons' class. For 'Boolean' type, the message will have the next structure:



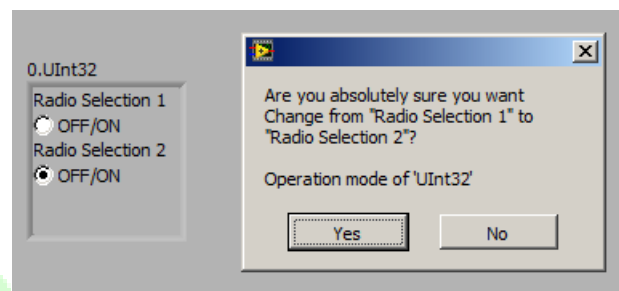
where "ON" is changed by the 'On text' and 'Off text' Boolean control properties depending on before control state.

For 'Ring NamedNumeric' type, the message has the next structure:




where "Item 1" is changed by the value before, by new value and "Item 2" and "UInt32" by shared variable name.

For 'Radio Buttons' type, the message has the next structure:





where "Radio Selection 1" is changed by the value before, by new value and "Radio Selection 2" and "UInt32" by shared variable name.

- 'Access Mode': it is associated depending on the associated variable 'Read/Write' attributes. It can be edited manually in order to avoid data inputs in R/W variables. It is shown as R: for 'Read Only' and W: for 'Read/Write'.
- 'Siemens S5 Time': No-lineal data conversion very useful in timers registers of PLC Siemens (Duplex).

- 'Blink on Alarm': Activate control/indicator blinking in case an alarm has been activated (it's been defined in variable properties) or a variable connection error in variable engine. It is shown as 

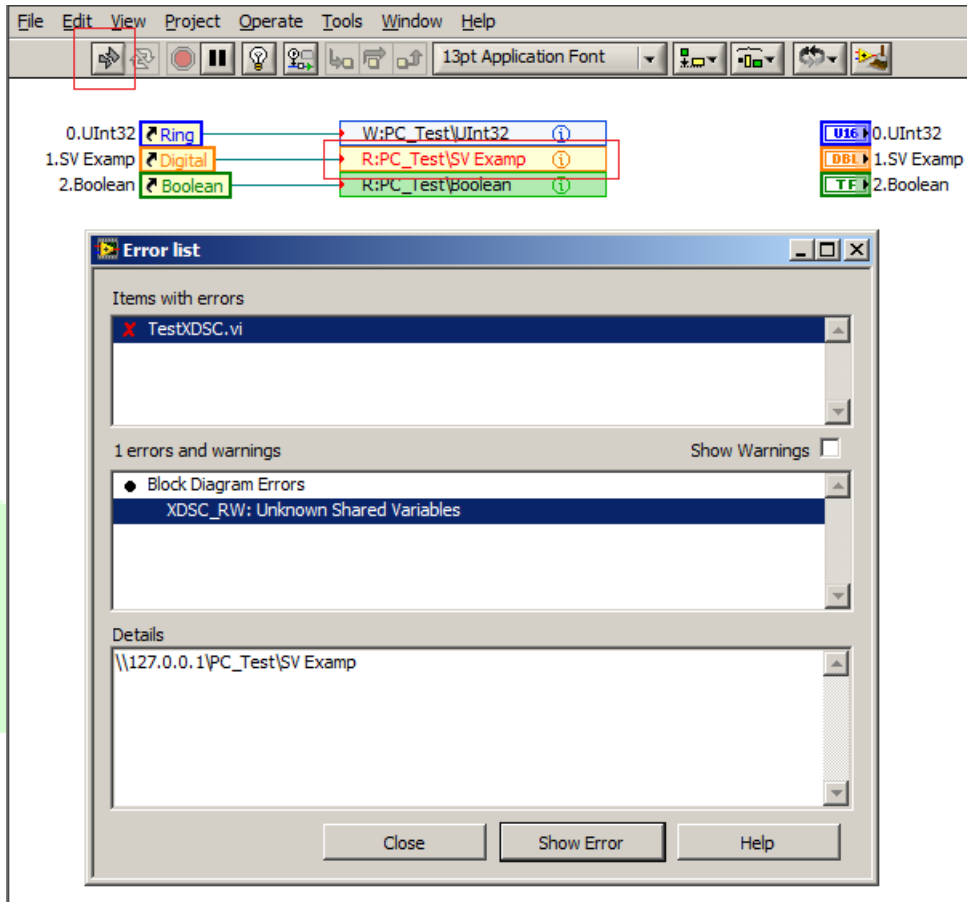
R:PC_FH1\est_cerranda_cooler
R:PC_FH1\est_m2_der_sinfin_trans_polvo
R:PC_FH1\est_m2_izq_sinfin_tran_polvo
R:PC_FH1\est_m3_ev_descarga
R:PC_FH1\est_v1_refrig_inter 
R:PC_FH1\est_v3_vent_principal
R:PC_FH1\est_limpieza_int
R:PC_FH1\est_ev_entrada_c1
R:PC_FH1\est_ev_entrada_c2 
R:PC_FH1\est_ev_entrada_c3
R:PC_FH1\est_ev_salida_c1
R:PC_FH1\est_ev_salida_c2
R:PC_FH1\est_ev_salida_c3
R:PC_FH1\est_ev_tapon

- 'Synchronous Write': Activate synchronous variable write operations in Variable Engine, deactivating user interface until it is checked the value has been written correctly. It is shown as . It can be combined with 'Write Synchronous' option in OPC client server configuration, let synchronous operations with PLCs,...

W:PC_FH1\or_marcha_paro_filtro 
R:PC_FH1\est_K_marcha_paro_filtro

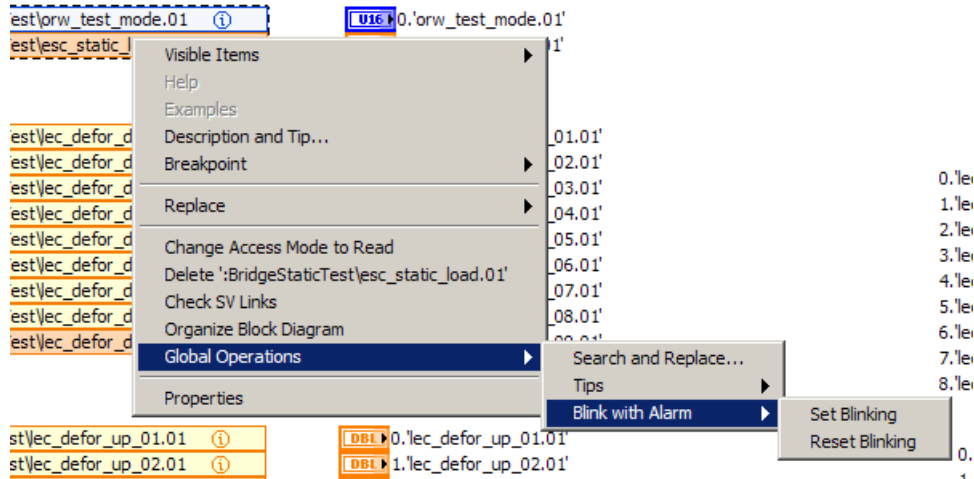
- 'Auto Link'

The component is updated automatically when the variable name is changed in the variable library, setting the generated code in all referenced *.lvlib. If it is not referenced correctly, the text colour will be red, setting the VI as 'not executable', and in error window the component is referenced.



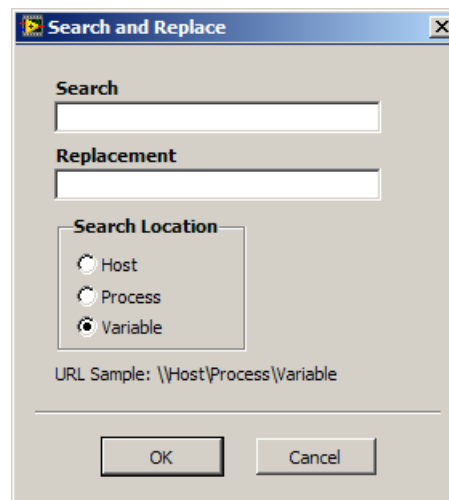
- 'Menu'

Push right mouse button over the component, it will appear a pop-up menu with all the tools you need to make standard operations.



- 'Change Access Mode to Read/Write': If a variable is only read type, it will be changed to Write/Read type, setting the new icon type.
- 'Delete: variable_name': It deletes the element selected, redrawing the associated diagram and setting the indexes and labels of controls/indicators enhanced.
- 'Check SV Links': Update 'Auto Link' property, enhancing component elements to *.lvlib variables that didn't exist when the project was opened.
- 'Organize Block Diagram': If you need to move during edition mode the elements associated to the component (controls/indicators terminals, connectors, references,...) this tool lets reorganize the auxiliary element position from the component.
- 'Global Operations/Search and Replace': it changes the URL components in every element which URL is referenced.
- 'Global Ops/Tips/Show-Hide Tips': it modifies 'Tip' property, activating or not for every element of the component.

- 'Global Ops/Blink with Alarm/Set-Reset Blinking': it modifies 'Blink' property, activating or not for every element of the component.



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C. XDSC BD. LabVIEW Component to read and write LabVIEW DSC PSP shared variables from Block Diagram

1. Introduction

Today to read/write variable PSP (Publish and Suscribe Protocol), the options are available:

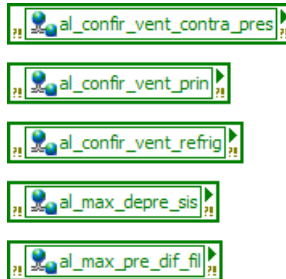


Figure 5. 'Access to shared variables values'

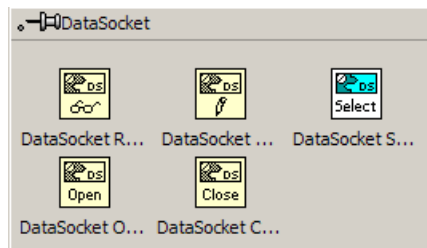


Figure 6. 'Palette Datasocket'

Provided by LabVIEW environment Figure 5 option allows individually variable access. In the case of Figure 6 programmatically way access is allowed to read and write shared variables using the PSP, Protocol (psp:...). Requires code or additional operations for example in the following cases:

- Manipulation of variables compact, efficient and scalable access code.
- Scale variables and full-duplex data conversions between the value used in the 'Block Diagram' and the process variable (non-linear and quadratic).
- Writing operations access code handling synchronous
- Quick and visual identification operations sequences in the Diagram Block bound variables (URL variable, write synchronously...).
- Scalability for replicated the Diagram Block in the case of applications where the same code accesses different processes
- Verification of writing in the process of input values variable

In order to make easier programmers work, we have designed a component based in Xnode technology implemented by LabVIEW.

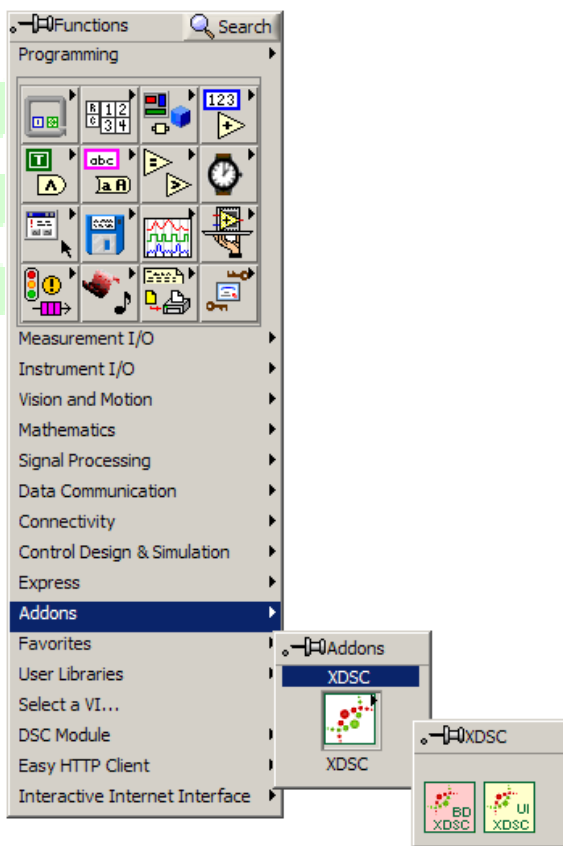
2. Description of the component

Component has been designed to use in write/read mode with the next data types:

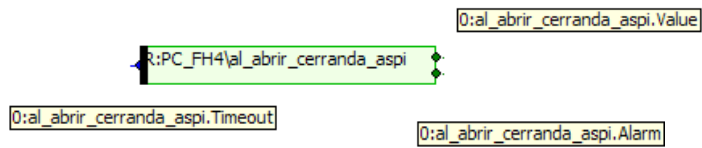
- Double precision floating Numeric (Analog), for Digital Numeric control/indicator classes. Support for Arrays of any size
- Booleans (Digitals), for Boolean control/indicator classes. Support for Arrays of any size
- Integer Numeric for NamedNumeric and Radio Buttons control/indicator classes.

PSP communication is based in Datasocket API, optimizing system resources through programming by events.

The component is used by dragging the 'Block Diagram' from the palette ' Functions >> Addons >> XDSC >> XDSC BD'



The parts of the component are:



- Information icon, where is located the information associated with the current settings of each element of the component.
- In the case of that component has a single element and read mode is configured, a terminal on the left side of the component is shown where you can connect the 'Timeout' value for read operations. The default value is 0, indicating that it returns the last value received from the Variable Engine. For positive values the component waits for a new value or status or new quality change. Negative values are waiting until it appears a change in value, status or quality.
- 'Value', with the value of the variable output terminal
- Output 'Alarm', which takes the value of 'True' attribute 'Quality' or 'Status' indicates that there is a problem with the current value, or if the shared variable has a configured and active an alarm.

3. Features in edit mode

The most outstanding characteristics in edit mode are:

- 'Automatic Tool Selection'

We have designed a central zone where 'Operate Value' has been activated, two lateral zones for 'Position/Size/Select' tool in order to move and resize activation and terminal zones where connect controls and indicators.

- 'Drag&Drop'

You can add new variables to component dragging them from variable lib, one by one or several at the same time. Each variable is identified by its URL 'mode:process\variable_name' ('R': read, 'W': write/read) data type (Green: 'Boolean', Orange: 'Numeric', Blue: 'NamedNumeric') are automatically assigned. If you use the option 'Array (Digital Numeric)' or 'Array (Boolean)', is indicated by the symbol [R] or [W]

R:PC_FH4\al_max_temp_in_fil
R:PC_FH4\al_min_temp_in_fil
R:PC_FH4\al_temp_in_fil
R:PC_FH4\al_termo1_temp_in_filtro
R:PC_FH4\al_termo2_temp_in_filtro
R:PC_FH4\al_temp_in_inter
W:PC_FH4\al_termo_temp_in_inter
R:PC_FH4\al_temp_out
R:PC_FH4\al_termo_temp_enfri_inter
W:PC_FH4\al_valv_aire_falso
R:PC_FH4\al_valv_in_humos_c1
R:PC_FH4\al_valv_in_humos_c2
R:PC_FH4\al_valv_in_humos_c3
R:PC_FH4\al_valv_out_humos_c1
R:PC_FH4\al_valv_out_humos_c2
R:PC_FH4\al_valv_out_humos_c3

- 'Resize'

The size of the component can be modified by dragging to up/down, allowing a maximum of 25 items by component. Lost components are removed to reduce the size.

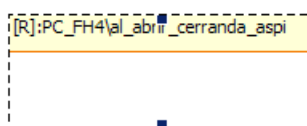


Figure 7: Feature 'Resize'

- 'DoubleClick'

Doing double click on the desired item you can modify the associated properties:

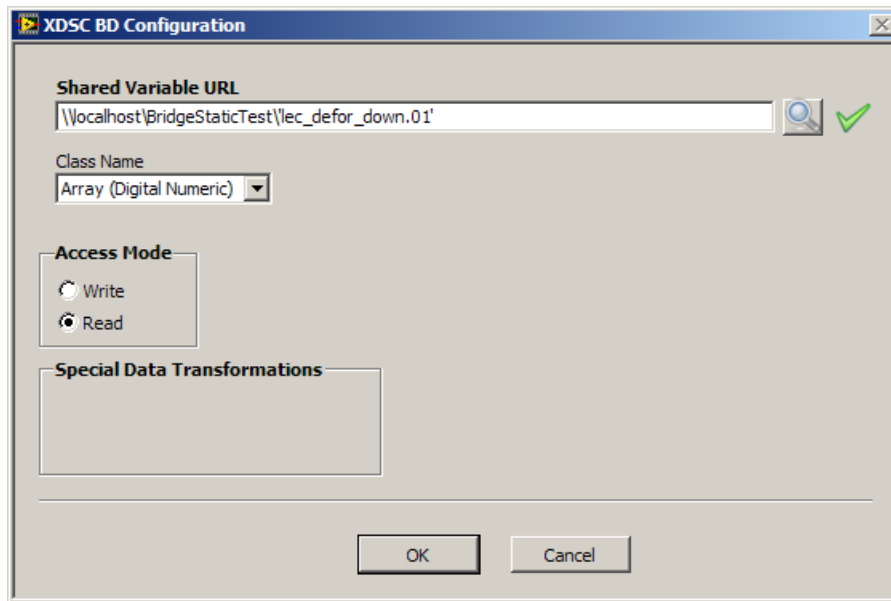
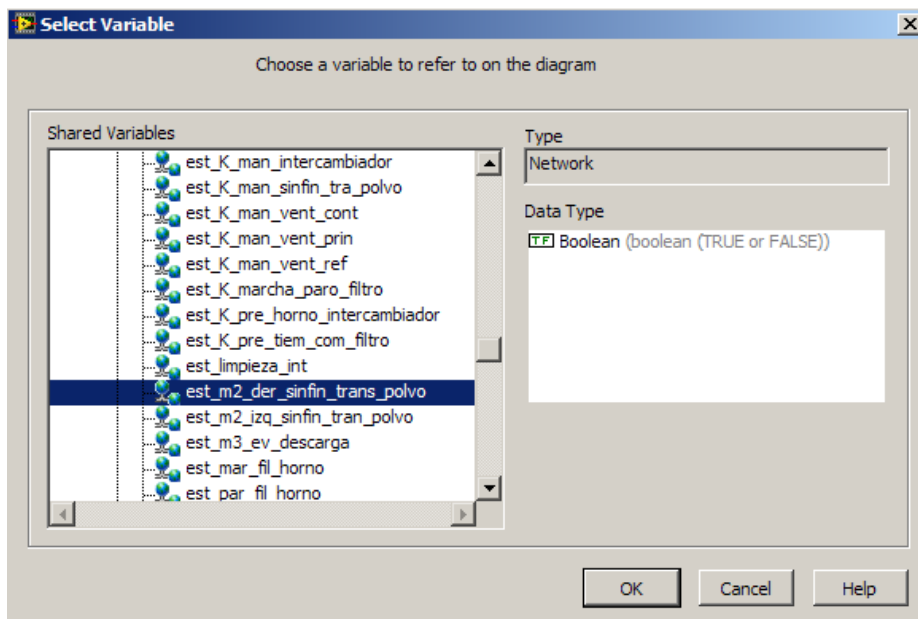


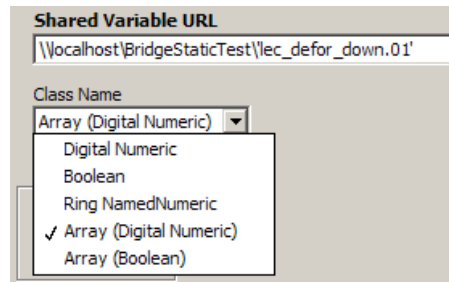
Figure 8. 'Feature DoubleClick'

Configuration panel includes next elements:

- 'Shared Variable URL': Complete URL of selected variable. Let introduce a new variable manually. URL is checked automatically if exists or not, activating or not the checkmark indicator.



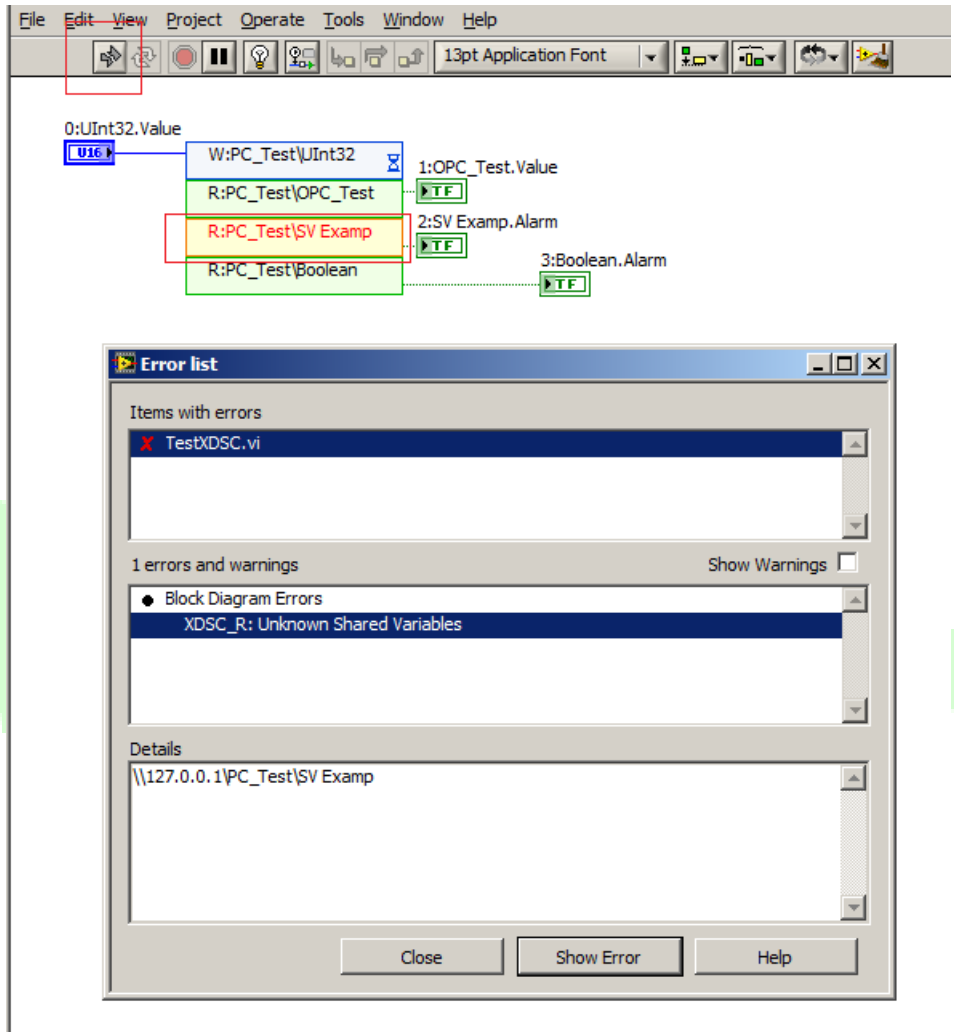
- 'Class Name': Data associated type. It will be assigned automatically, but it can be modified manually.



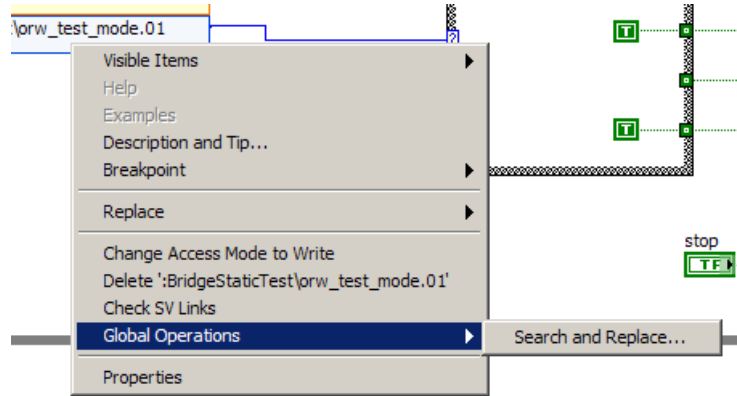
- 'Siemens S5 Time': No-lineal data conversion very useful in timers registers of PLC Siemens (Duplex).
- 'Synchronous Write': Activate synchronous variable write operations in Variable Engine, deactivating user interface until it is checked the value has been written correctly. It is shown as . It can be combined with 'Write Synchronous' option in OPC client server configuration, let synchronous operations with PLCs,...

W:PC_Test\UInt32

- 'Auto Link': The component is updated automatically when the variable name is changed in the variable library, setting the generated code in all referenced *.lvlib. If it is not referenced correctly, the text colour will be red, setting the VI as 'not executable', and in error window the component is referenced.



- 'Menu'
Clicking the right button on the component, displays a menu with the tools required to perform common operations.



- 'Change Access Mode to Read/Write': If a variable is only read type, it will be changed to Write/Read type, setting the new icon type.
- 'Delete: variable_name': It deletes the element selected, redrawing the associated diagram and setting the indexes and labels of controls/indicators enhanced.
- 'Global Operations/Search and Replace': it changes the URL components in every element which URL is referenced.

