

Using Calculations to add Intelligence to Displays

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Adding Calculations to a Display

- ❖ Options Menu – Display Calculations
 - Select calculation number (calculations are performed in order)
 - Click on the Add button to get the Calculation editor

Adding Nodes to a Calculation

- ❖ Four types of nodes:
 - Inputs – Point values, constants, etc.
 - Operations – arithmetic, trig functions, comparisons
 - Multiplexor – select one of several values
 - Output – Fixed node provided by editor

- ❖ Node addition to calculation
 - Click on node type from selection list on left of editor
 - Click and drag node onto the calculation diagram on the right

Connecting Nodes

- ❖ Connect by dragging a line from the source node to the destination node
 - Put cursor over source node (node providing data for input into the destination node). Order is important – flow is from source to destination
 - Hold the left mouse button down
 - Drag cursor to the destination node. A “rubber-band” line is drawn while the mouse is moved
 - Release the mouse button when the cursor is over the destination node

Finishing a Calculation

- ❖ Valid Calculation required before exiting Calculation editor
 - Single connection must go to the output node
 - All nodes must have minimum number of input connections

- ❖ Description highly recommended
 - Used in selection dialog when editing calculations
 - Used for status bar when there is a mouse-over event on an entity being driven by the calculation

Editing/Duplicating a Calculation

- ❖ Two methods to start edit process
 - Click on calculation in selection list, click on Edit button
 - Double-click on calculation in selection list

- ❖ Duplicating into a new calculation number
 - Click on calculation in selection list
 - Set calculation number for new duplicate calculation in control
 - Click on the Duplicate button

Editing Nodes

❖ Moving a Node

- Hold down the shift key
- Drag node using left mouse button
- Remember – Nodes are processed in spatial order, left to right, top to bottom
- Connections will remain, with the connection lines moving to match the node

Editing Nodes (Cont)

❖ Deleting a Node

- Hold down the control key
- Double-click on the node using the left mouse button
- All connections, both inputs and outputs are deleted with the node

Editing Nodes (Cont)

- ❖ Changing an input node constant
 - Double-click on the node using the RIGHT mouse button
 - Constant values, time values, and selected points can be changed in input nodes
 - Useful when duplicating a calculation for another input point

Editing Connections

❖ Deleting a connection

- Hold down the shift key
- Drag a connection in the same manner that you use to create one
- When one connection of a multiple input node is deleted, the other connections move down one in order (important for the multiplexor node and any non-associative arithmetic nodes, as well as comparison operations)

Boolean Nodes

- ❖ All values in Display Calculations are floating numbers
- ❖ Boolean values mapped to floating numbers
 - False represented as 0.0
 - True represented as 1.0
- ❖ Comparison Nodes return Booleans from floating inputs
- ❖ Boolean operators (AND, OR, etc.) treat all other non-zero numbers as true

Multiplexor Node

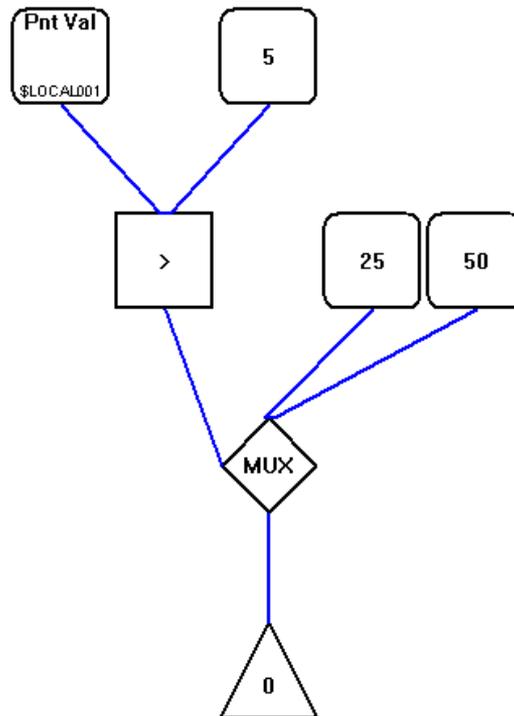
- ❖ Used to select one of many choices
 - If-Then-Else block
 - Data Table

Multiplexor Node (cont)

- ❖ Selection based on “integerized” value of first input
 - Second input associated with values 0 and less
 - Next input associated with value 1
 - Third with value 2, etc.
 - Last associated with value N and greater, where N is the number of inputs to the multiplexor minus 2

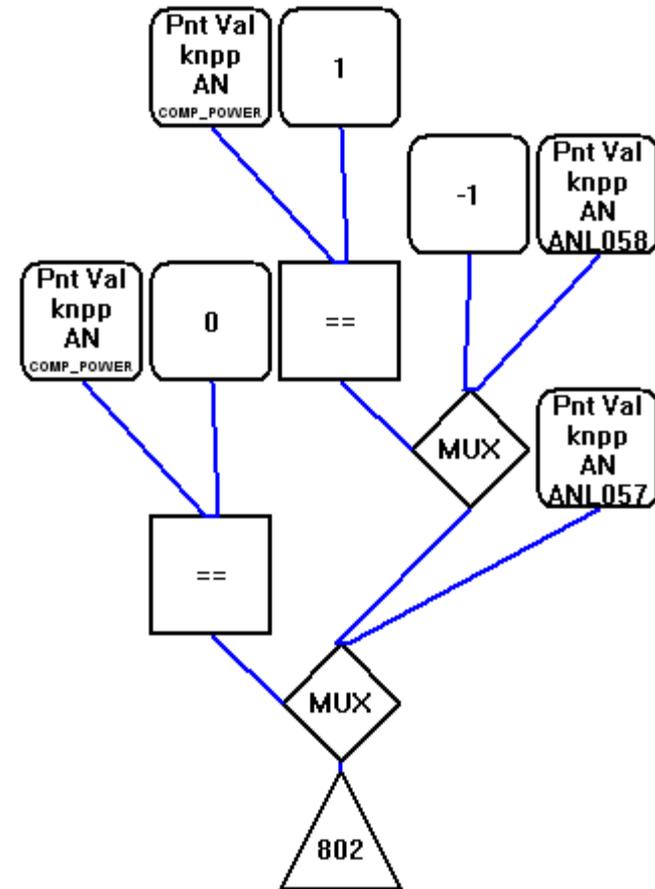
Multiplexor Node (cont)

- ❖ Example of Multiplexor used as an If-Then-Else block
- ❖ If $\$LOCAL001 > 5$ then 50, else 25



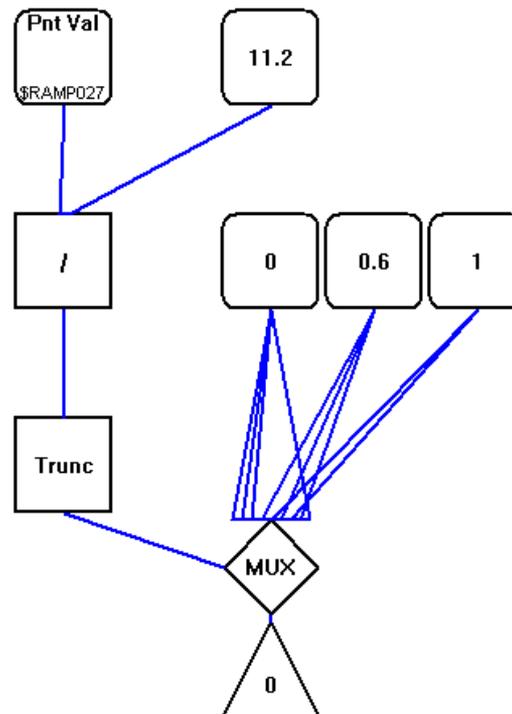
Multiplexor Node (cont)

- ❖ For Else-If blocks, nest the multiplexors
- ❖ If COMP_POWER=0 Then
 Use Point ANL057
Else If COMP_POWER =1 Then
 Use Point ANL058
Else
 Return a -1
End If



Multiplexor Node (cont)

- ❖ Example of Multiplexor used as a Data block
- ❖ X – axis data for RTIME UGM X-Y trend example



Multiplexor Node (cont)

- ❖ More than just values can pass through a multiplexor
- ❖ Example of choosing a point ID based on a value

