How to get an average value of a Real or Integer variable which is sampled every fixed interval (or sampled in every PLC scan)?

Download FAQ-099 Demo

Please refer to http://www.icpdas.com/en/faq/index.php?kind=280#751 > FAQ-120 for two better C-functions - “Aver_N” and “Aver_F” (for WP-8xx7, VP-2xW7 and XP-8xx7-CE6 only).

There is some applications to calculate the moving average of a Real or Integer variable. The Real or Integer variable is sampled once and calculated the moving average value at every fixed interval. To do that, user can use the “Averag_F” function block to get the moving average value of a Real variable. (Or the “Averag_N” function block to get the moving average value of an integer variable).

Algorithm for the above application:
Consider the sampled data F1, F2... F10... at each interval and the given number to calculate the average is 5. Then the average value will be (F1+F2+F3+F4+F5)/ 5, then next average value will be (F2+F3+F4+F5+F6)/ 5, next (F3+F4+F5+F6+F7)/ 5... (The oldest sampled data will be erased)

There is also some applications to calculate the average value of a Real or Integer variable. The Real or Integer variable is sampled once every fixed interval and calculated the average value during a given number of samples. To do that, user can use the “Gt_Ave_R” function block to get the average value of a Real variable. (Or the “Gt_Ave_N” function block to get the average value of an integer variable).

There is also some applications to calculate the average value of a Real or Integer variable. The Real or Integer variable is sampled once in every PLC scan and then calculated the average value when the specified time is up. To do that, user can use the “Gt_Av_R2” function block to get the average value of a Real variable. (Or the “Gt_Av_N2” function block to get the average value of an integer variable).

You can get the above six function blocks at the following address.
http://www.icpdas.com/web/product/download/software/development_tool/isagraf/document/faq/faq099_demo.zip or
http://www.icpdas.com/en/faq/index.php?kind=280#751 > FAQ-099

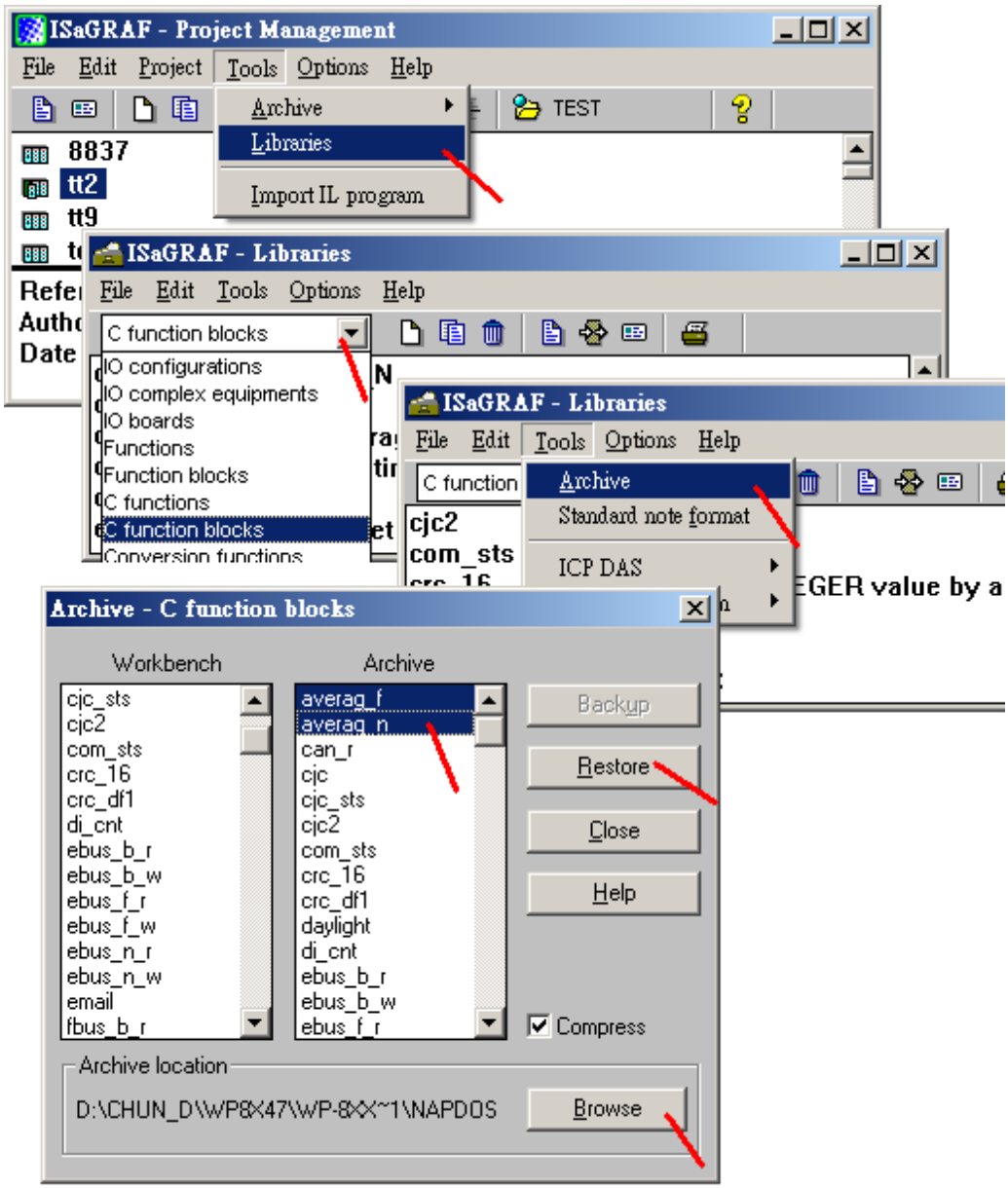
wdmo_74a.pia: which contains the “Gt_Ave_R” function block
wdmo_74b.pia: which contains the “Gt_Ave_N” function block
wdmo_74c.pia: which contains the “Gt_Av_R2” function block
wdmo_74d.pia: which contains the “Gt_Av_N2” function block
wdmo_74e.pia: which uses the “Averag_F” and “Averag_N” function blocks

Note: “Averag_F” and “Averag_N” are supported in the following driver version.
W-8xx7/8xx6 (driver 4.13A or later)

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uPAC-7186EG (driver 1.06 or later)
iPAC-8x47 (driver 1.04 or later)
WinPAC-8xx7/ 8xx6 (driver 1.08A or later)

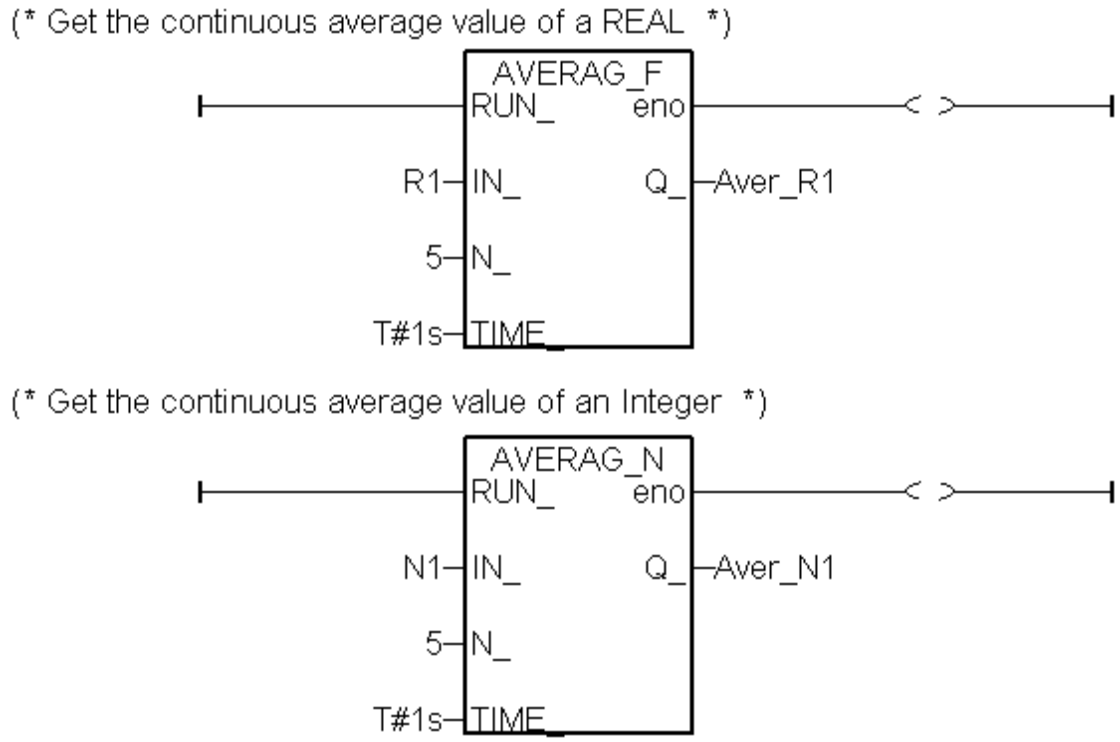
To use the “Averag_F” and “Averag_N” function blocks, please restore their library definition file “Averag_F.fia” and “Averag_N.fia” to your PC/ ISaGRAF as below.



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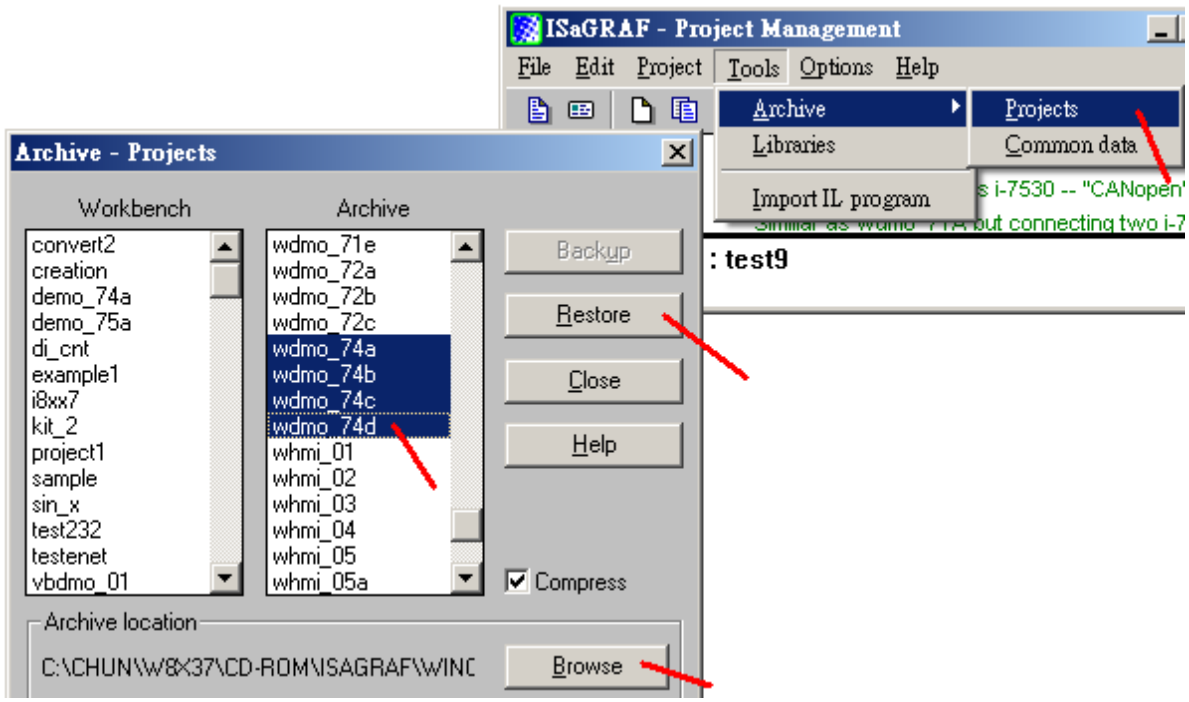
Then you may refer to the “wdmo_74e” project to test these two function blocks.
The sampled number (parameter “N_”) can be 1 to 20 only for iP-8xx7 and uPAC-7186EG. While “N_” can be 1 to 50 for WP-8xx7 (driver 1.18 or later) and VP-2xW7 (driver 1.09 or later) and W-8xx7 (driver 4.18 or later).
The interval setting (parameter “TIME_”) can be T#0s or T#10ms to T#1h. Setting as T#0s means to sample and calculate once at each calling. (Normally, this means in every PLC scan).

wdmo_74e:

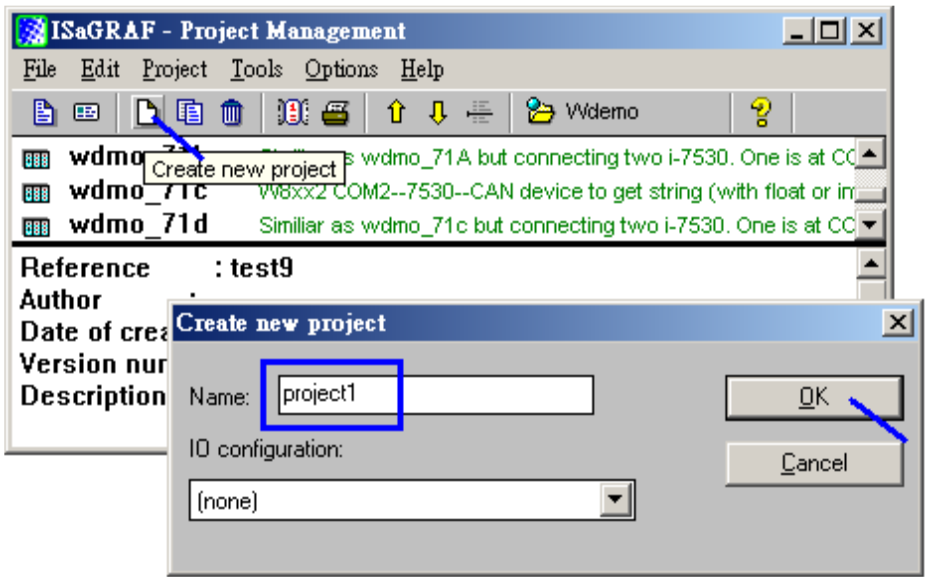


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To use the “Gt_Ave_R”, “Gt_Ave_N”, “Gt_Av_R2”, “Gt_Av_N2”, please restore the following four project files into your PC/ ISaGRAF as below.

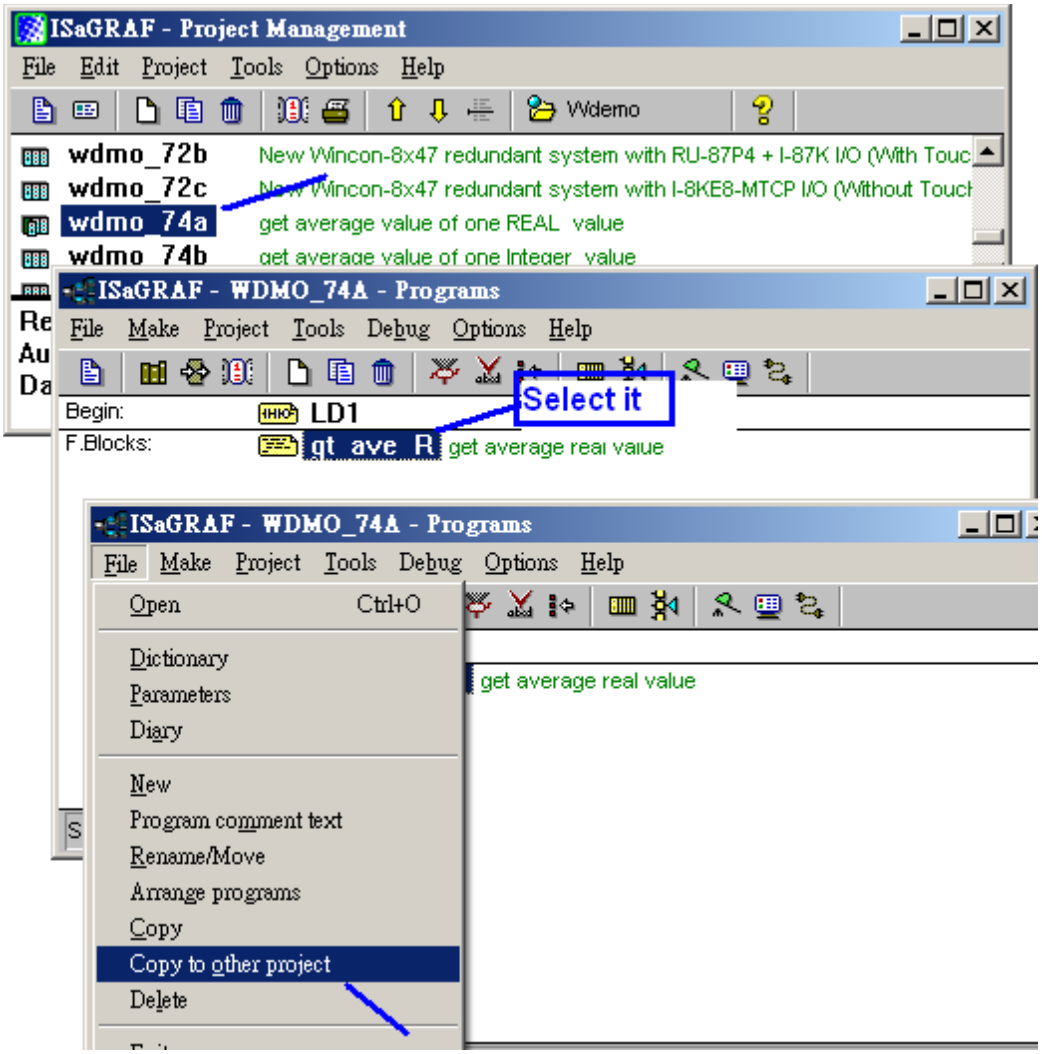


Then please create a new project for your application, for example, the below “project1”.



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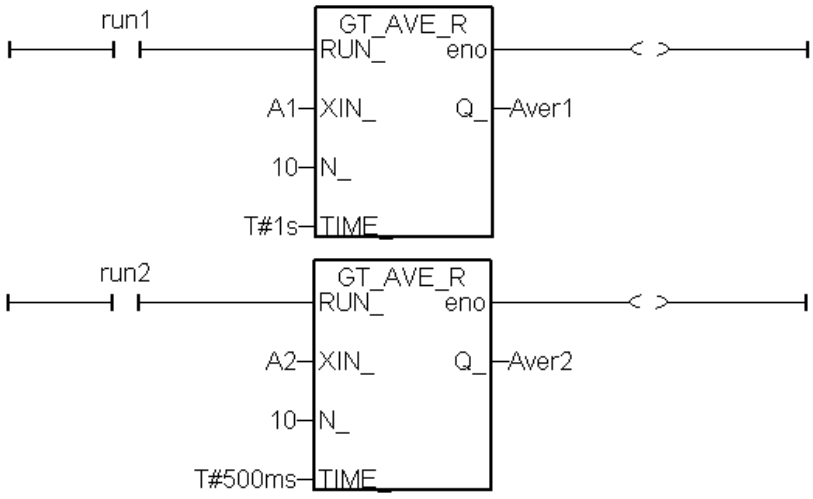
Then get into the “wdmo_74a” (while “wdmo_74b” is for “Gt_Ave_N”, “wdmo_74c” for “Gt_Av_R2”, “wdmo_74d” for “Gt_Av_N2”). Select “Gt_Ave_R”, and copy it to the “project1”



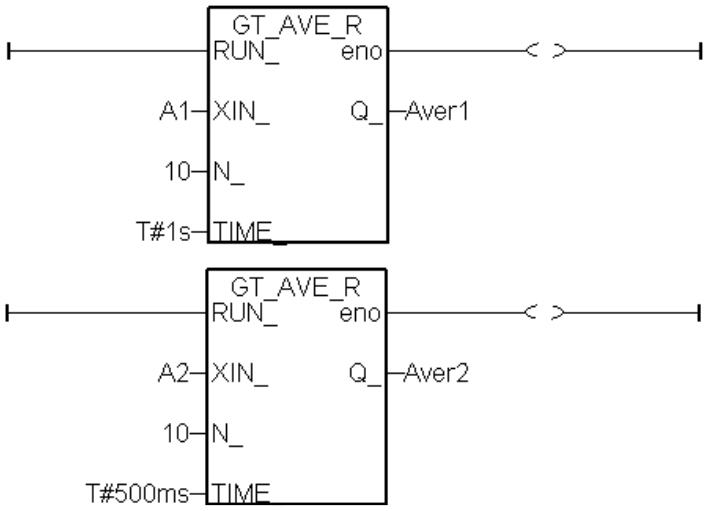
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Now you can create a Ladder program in your project to use the “Gt_Ave_R” and “Gt_Ave_N” (or “Gt_Av_R2” or “Gt_Av_N2”).
The below example is to calculate the average value of “A1” - Real variable, and calculate the average value of “A2” - Real variable. (For Integer, please use “Gt_Ave_N” in “wdmo_74b.pia”)
When “run1” is True, it starts to sample A1 every 1 second. When 10 samples reached (that is 10 seconds later), it calculate the new average value to “Aver1”.
When “run2” is True, it starts to sample A2 every 0.5 second. When 10 samples reached (that is 5 seconds later), it calculate the new average value to “Aver2”.

Note: 1. Please do not set 0 or less than 0 to the “N_” parameter. The “TIME_” must less than T#6h
2. The “Gt_Ver_R” is better to run in the uPAC-7186EG, iPAC-8x47, Wincon-8xx7 and WinPAC-8x47 such advanced controllers. It is not good to run in the 40MHz CPU: I-7188EG/XG and I-8xx7. Because the 40MHz CPU will be very slow when doing floating-point calculation.



Or calculate directly without the “Run1” and “Run2”



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