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2.6 Using Variable Array

Click the link for more [ISaGRAF FAQ](#).

If your ISaGRAF Workbench is version of 3.4 or 3.5, you can declare variable array in the ISaGRAF dictionary, And then program them in each language (ST, LD, FBD, SFC, IL & FC). Please close all ISaGRAF windows first, and then add two extra lines in your ISaGRAF workbench root “EXE” directory, normally in the c:\isawin\exe.

In the “C:\ISAWIN\EXE\ISA.INI”, adds two extra lines on the top of this file.

[DEBUG]
arrays=1

And then re-open the ISaGRAF workbench, you will find there is one more “Dim” column in the ISaGRAF dictionary. The number entered can be 1 to 512.

However it is very important, please always declare the proper number you want. The larger “Dim” number, the larger memory is consumed.

If using “Variable Array” in the program, please **DO NOT** check the 2nd , 7th , 8th and 9 th Optimizer options, or the value of the Variable array will be incorrect.

Recommend to check only the 1st – “Run two optimizer passes” option.

The index of the variable array is always starting from 0. For example, if you declare an integer “CNT” with “Dim” = 10 , the variable array will be CNT[0..9] , that is the item can be used is CNT[0], CNT[1], ..., CNT[9].

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How to program variable array ?

For example, the below ST code can assign an initial value of 100 to 109 to CNT[0] to CNT[9]

(* INIT is declared as an internal Boolean with initial value of TRUE *)

(* CNT is declared as an integer array with "Dim" = 10 *)

(* ii is declared as an internal integer *)

```

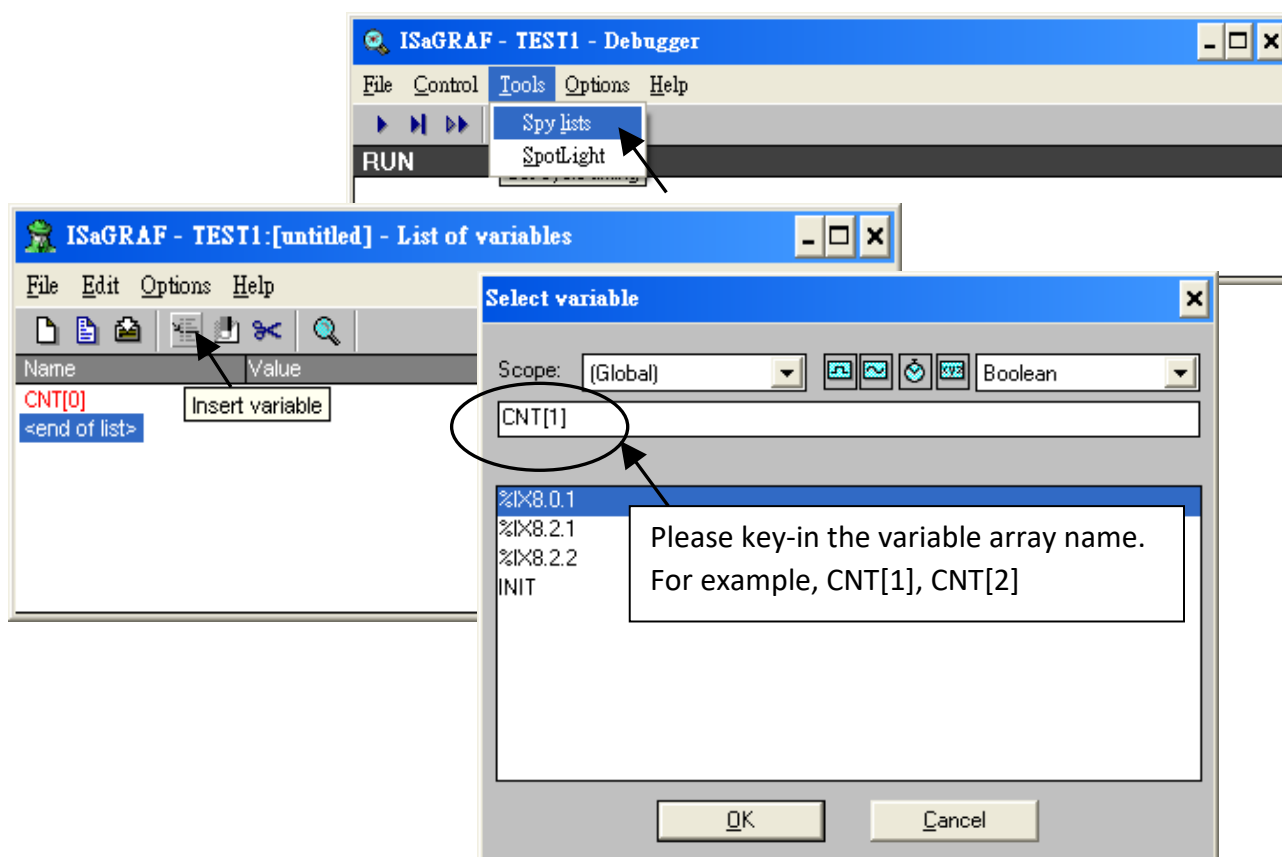
IF INIT THEN
    INIT := FALSE ; (* only do it once at 1st PLC scan cycle *)
    For ii := 0 to 9 do
        CNT[ii] := 100 + ii ;
    End_For ;
END_IF ;

```

Note: Please do not exceed the "Dim" number of variable array. For example please do not program at CNT[10] or CNT[11] in the above example since the CNT 's dimension is only 10 , CNT[0], CNT[1], ..., CNT[9]. There is no CNT[10], CNT[11], ...

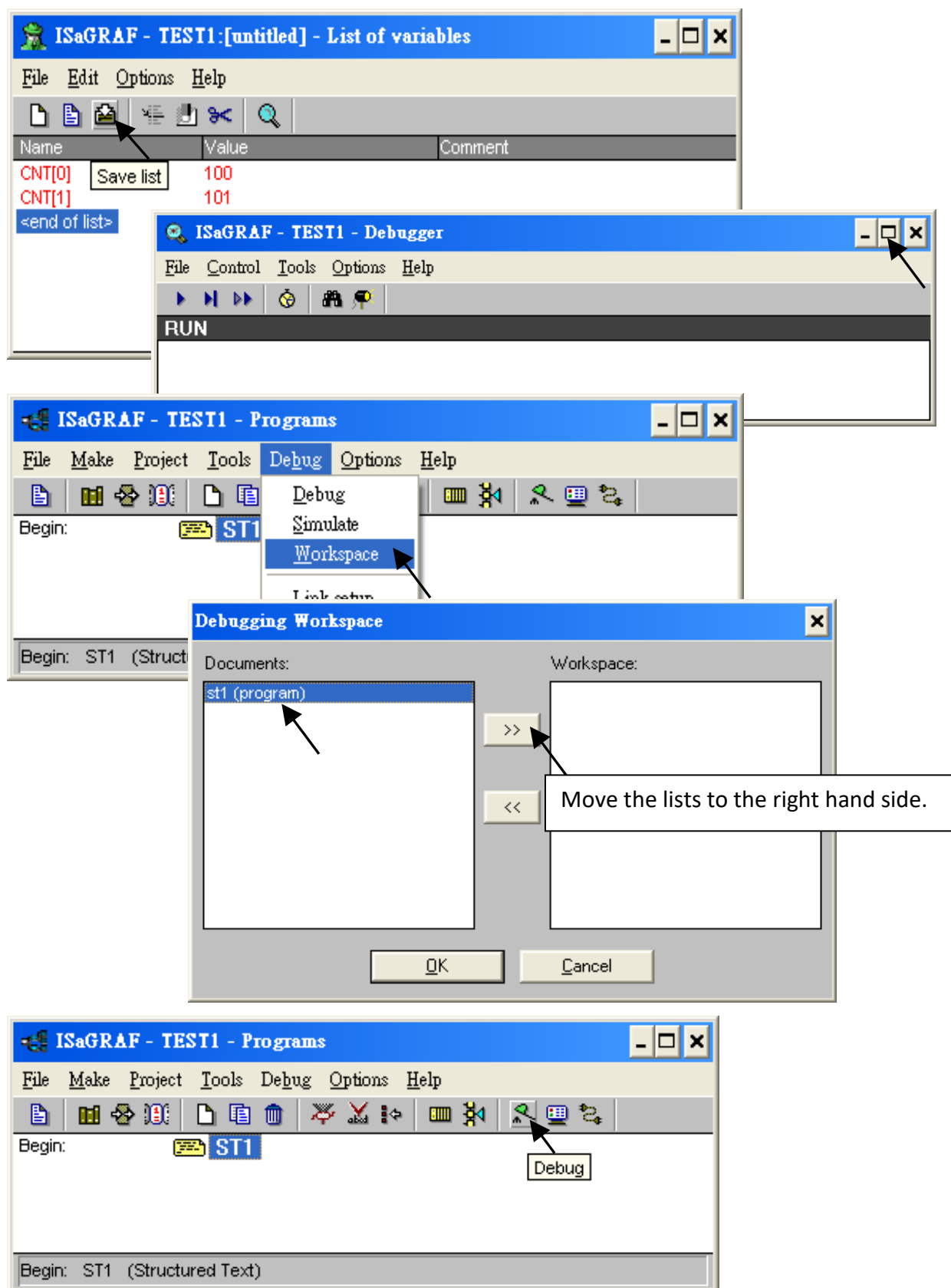
How to debug variable array ?

After you compile your ISaGRAF project, you may download the project to the controller or simulate it. Please open the "Tools" - "Spy lists" on the "Debugger" windows. Refer to section 9.12 of ISaGRAF user manual for more details about "Spy lists". Insert the name you want to debug.



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Please remember to save the “spy list” to a name, for example – “list1” and then put it into the workspace. You will find the “list1” will automatically pop-up when you open the debugger.



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2.6.1 Assign Network address No. To Variable Array

To assign Modbus Network address number to the variable array. Please assign the network address number to the first element, For example, No. = 1 assigned to CNT[0]. And the using “S_MB_ADR()” function as below.

The screenshot shows the 'Integer/Real Variable' dialog box. The 'Name' field contains 'CNT', 'Network Address' contains '1', and 'Dim' contains '10'. A callout box points to the 'Network Address' field with the text: 'Please assign the first number for the first element. (please refer to section 4.1 for more information) The number enter here is always in Hex. format.'

And then using “S_MB_ADR” to assign the other network address number for each element. For example,

1. Assign continuous Network No = 1 ,2 ,3, ...,10 to CNT[0], CNT[1], CNT[2], ..., CNT[9]

(* INIT is declared as internal Boolean with initial value at TRUE *)

(* TMP is declared as internal Boolean *)

```
IF INIT THEN
    INIT := FALSE ; (* only do it at 1st PLC scan *)
    TMP := S_MB_ADR(1, 10, 0); (* assign 10 elements starting at No.=1, continuous No. *)
END_IF;
```

2. Assign Jumping Network No = 1 , 3 , 5, ...,19 to CNT[0], CNT[1], CNT[2], ..., CNT[9]

(* INIT is declared as internal Boolean with initial value at TRUE *)

(* TMP is declared as internal Boolean *)

```
IF INIT THEN
    INIT := FALSE ; (* only do it at 1st PLC scan *)
    TMP := S_MB_ADR(1, 10, 1); (* assign 10 elements starting at No.=1, jumping No. *)
END_IF;
```

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2.6.2 Setting Variable Array As Retained Variable

To set “variable array” as retained data, please assign the network address number to the first element, For example, No. = 1 assigned to CNT[0]. And then using “Retain_A()” function as below. Please refer to section 10.1 of ISaGRAF user manual for more details about the “New retained function”.

Integer/Real Variable

Name: Network Address:

Comment:

Unit:

Attributes:

- ☒ Internal
- ☐ Input
- ☐ Output
- ☐ Constant

Format:

- ☒ Integer
- ☐ Real

Initial value:

☐ Retain

Dim:

Buttons: Store, Cancel, Next, Previous

Callout 1: Please assign the first number for the first element. (please refer to section 4.1 for more information) The number enter here is always in Hex. format.

Callout 2: Do Not check the “Retain” option for variable array.

For example, setting integer variable array CNT[0..9] as retained data in the integer retained memory starting from 20, 21, ... to 29.

(* INIT is declared as internal Boolean with initial value at TRUE *)

(* TMP is declared as internal Boolean *)

IF INIT THEN

INIT := FALSE ; (* only do it at 1st PLC scan *)

TMP := Retain_A('N', 1, 10, 20) ;

(*

1st parameter : 'B' : boolean , 'N' : Integer , 'F' : Real , 'T' : Timer

2nd parameter : Network address No. for the 1st element of the "Variable Array".

3rd parameter : 1 - 255 , number of element in the “variable array” to be assigned as retained data.

4th parameter : starting retained address for this “variable array”.

7188EG/XG+X607/608, I-8xx7+S256/512 : 'B' & 'T' is 1 to 256 , 'N' & 'F' is 1 to 1024 .

Wincon-8xx7/8xx6+S256/512 : 'B' & 'T' is 1 to 1024 , 'N' & 'F' is 1 to 4096 *)

Download ISaGRAF user manual at

<http://www.icpdas.com/en/download/show.php?num=333&nation=US&kind1=&model=&kw=isagraf>