2.6 Using Variable Array

Click the link for more ISaGRAF FAQ.

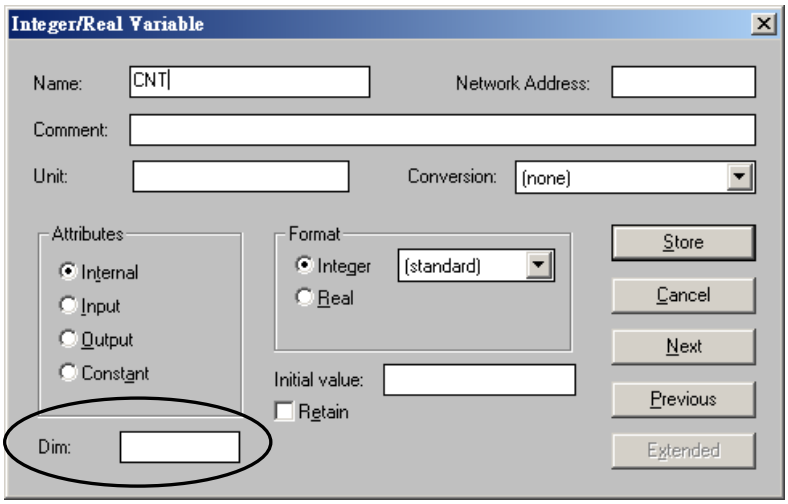
If your ISaGRAF Workbench is version of 3.4 or 3.5, you can declare variable array in the ISaGRAF dictionary, And then program them in each language (ST, LD,FBD, SFC, IL & FC). Please close all ISaGRAF windows first, and then add two extra lines in your ISaGRAF workbench root "EXE" directory, normally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

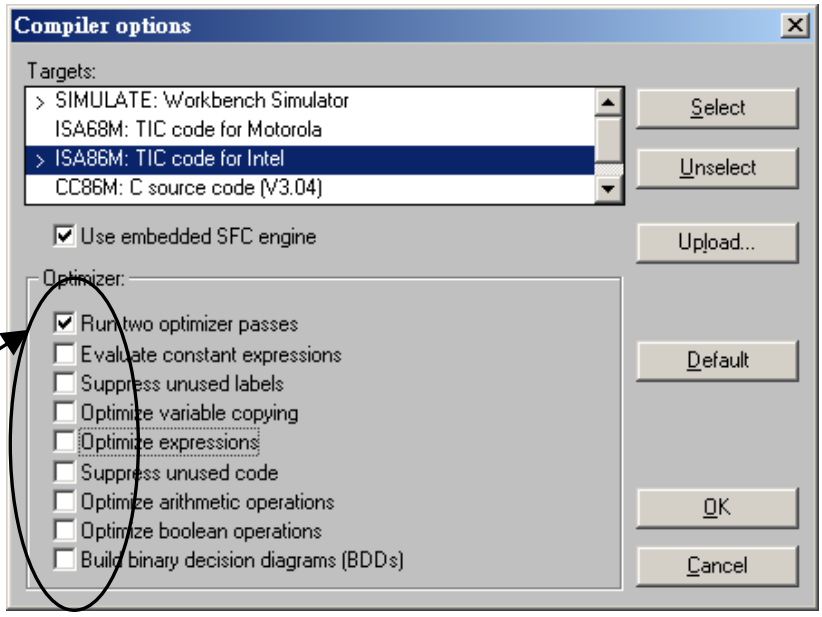
In the "C:\ISAWIN\EXE\ISA.INI", adds two extra lines on the top of this file.

[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 varable 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 intial value of 100 to 109 to CNT[0] to CNT[9]

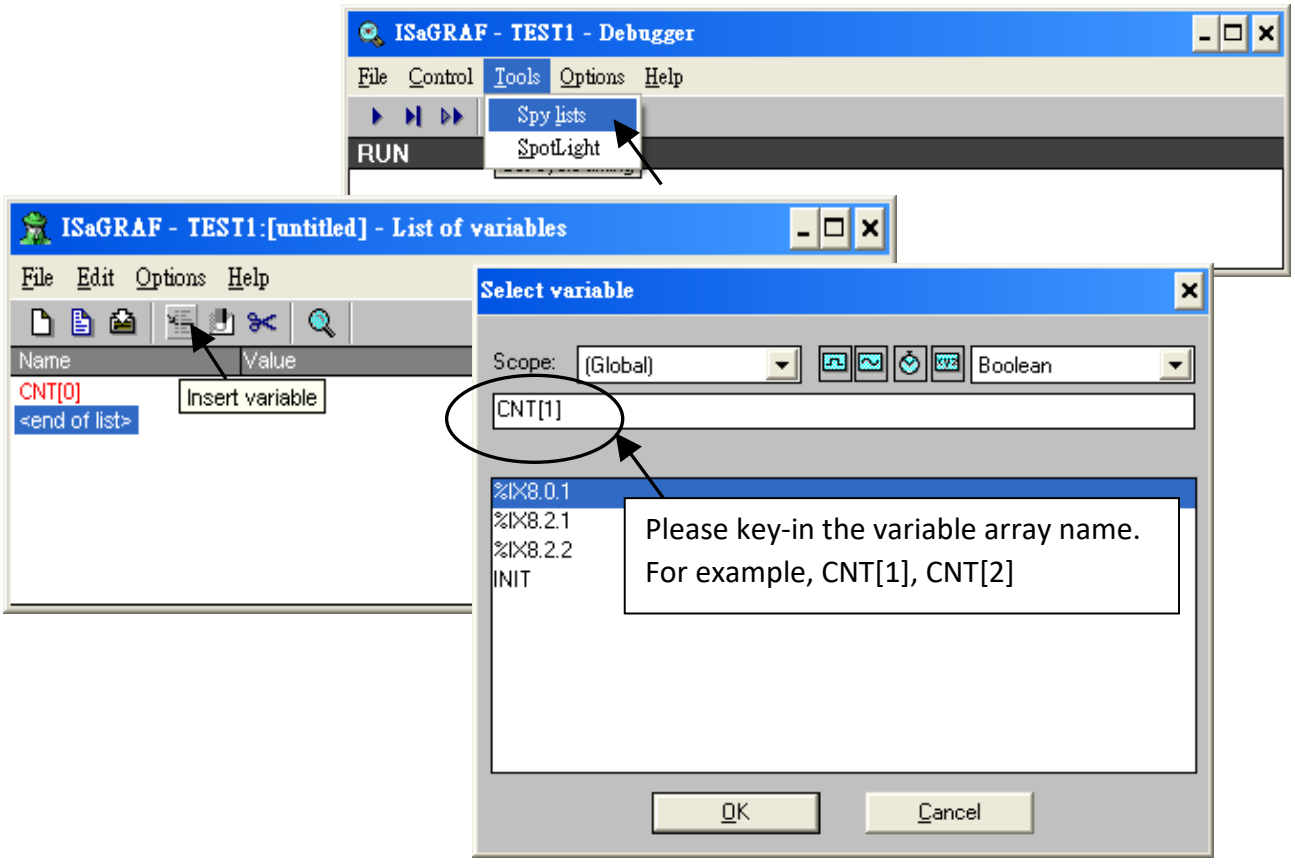
```
(* INIT is declared as an internal Boolean with initial value of TRUE *)
(* CNT is declared as an integer array with "Dim" = 10 *)
(* ii is declared as an internal integer *)

  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], …

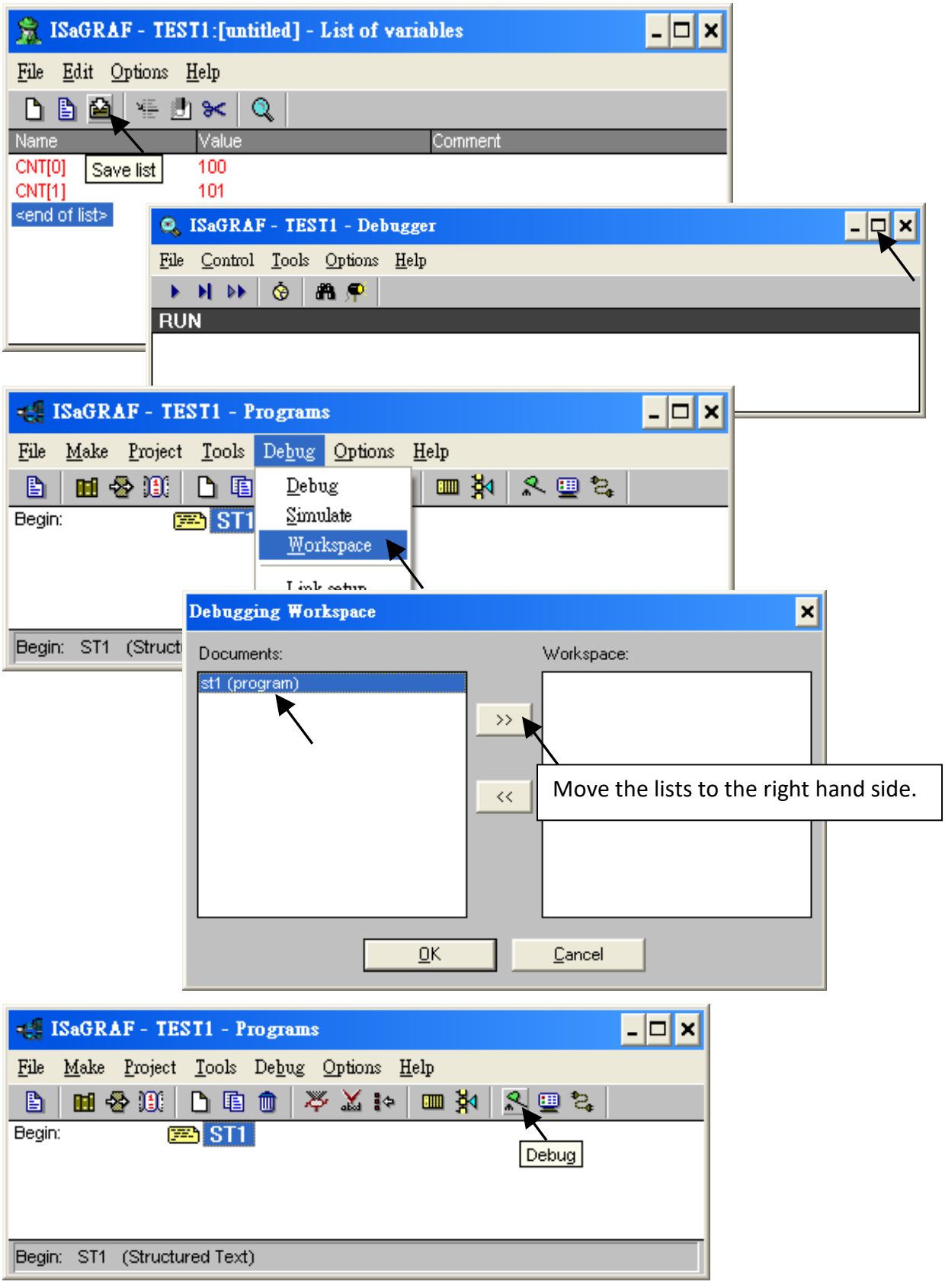
How to debug variable array ?

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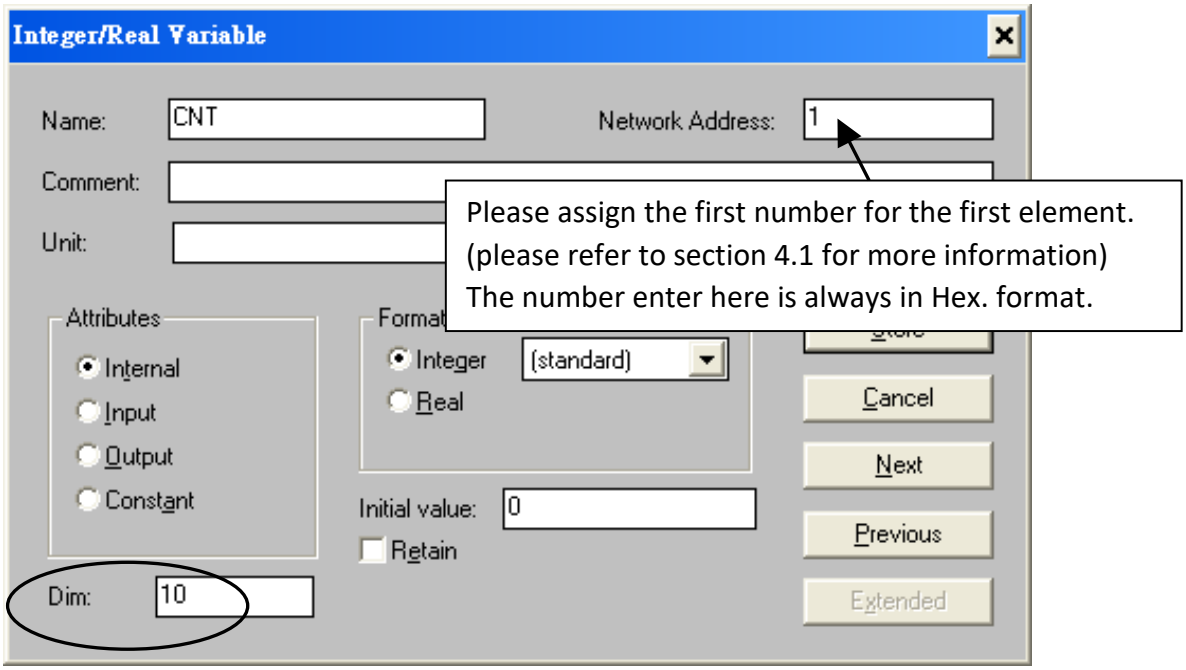
Please remember to save the “spy list” to a name, for example – “list1” and then put it into the workspace. You will find the “list1” will automatically pop-up when you open the debugger.



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2.6.1 Assign Network address No. To Variable Array

To assign Modbus Network address number to the varable 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.



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]

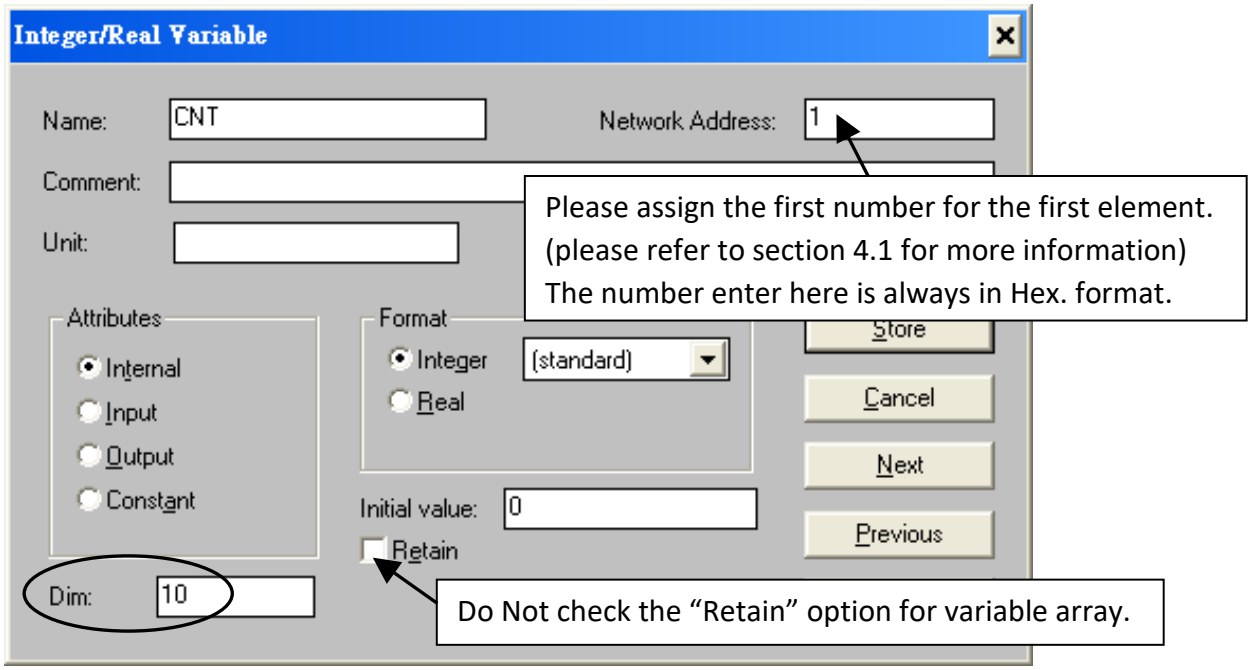
```
(* INIT is declared as internal Boolean with initial value at TRUE *)
(* TMP is declared as internal Boolean *)

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 “varable 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”.



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

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