How to record I-8017H ’s Ch.1 to Ch.4 voltage input in S-256/512 on I-8437-80 or I-8837-80 ? The sampling time is one record every 0.05 second. The record period is 1 to 10 minutes. Then PC can download this record and display it as a trend curve diagram by M.S. Excel?

Download FAQ-058 Demo.

This demo is the “Demo_71” can run in I-8437-80 or in I-8837-80 (80MHz). The PAC driver should be version of 3.19 or later version. Visit to the webpage to download files.

Driver:
http://www.icpdas.com/en/download/show.php?num=368&nation=US&kind1=&model=&kw=isagraf
Demo:
http://www.icpdas.com/en/download/show.php?num=1005&nation=US&kind1=&model=&kw=isagraf
ISaGRAF FAQ:
http://www.icpdas.com/en/faq/index.php?kind=280#751 (FAQ-058)

I-8437-80 and I-8837-80 PAC‘s CPU is running at 80MHz. The speed is about 2 to 4 time faster than I-8437 and I-8837 (40MHz CPU). So it can record minimum to 25 milli-second sampling data. While using I-8437 and I-8837 (40MHz) , it can record only 100 ms or above sampling data. This minimum sampling time depends on your ISaGRAF program‘s PLC scan time. If the PLC scan time is large, like 200ms, then you can do sampling only larger than 200 ms.

How to test this demo ?

You may run VB 6.0 - “Demo_6” in your PC to on-line control this I-8837-80 via ethernet . Or just push the pushbutton on the front panel of the I-8437-80/8837-80 to start/stop it.

1. Please plug one I-8024 in I-8437-80 ’s Slot 2, one I-8017H in Slot 3. (Note: the left-most I/O slot No. of the I-8xx7 is 0 , not 1) .Then connect Ch1. to Ch.4 voltage output of I-8024 to Ch1. to Ch.4 of I-8017H. Then power up this I-8437-80.

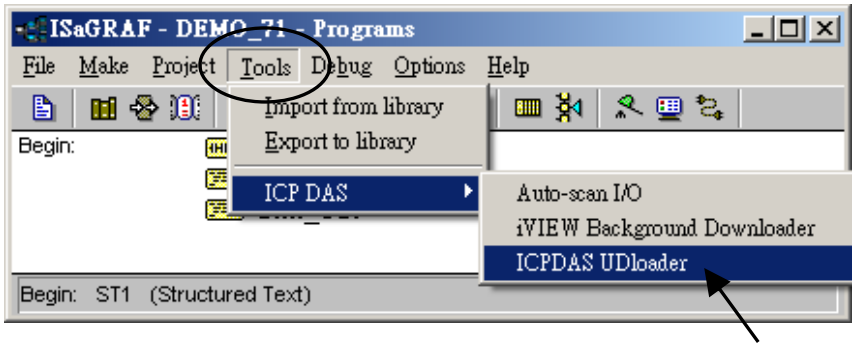
2. Download the ISaGRAF project - “Demo_71” to the I-8437-80 .

3. At run time, you may press pushbutton 1 to start recording. Then it will record data during 2 minutes. You can see the displayed number on the front panel decreasing to 0 and blinking. If recording is finished, the 3 Leds on the front panel will blink and the displayed number will be 0. To stop at anytime, just press pushbutton 4 once.

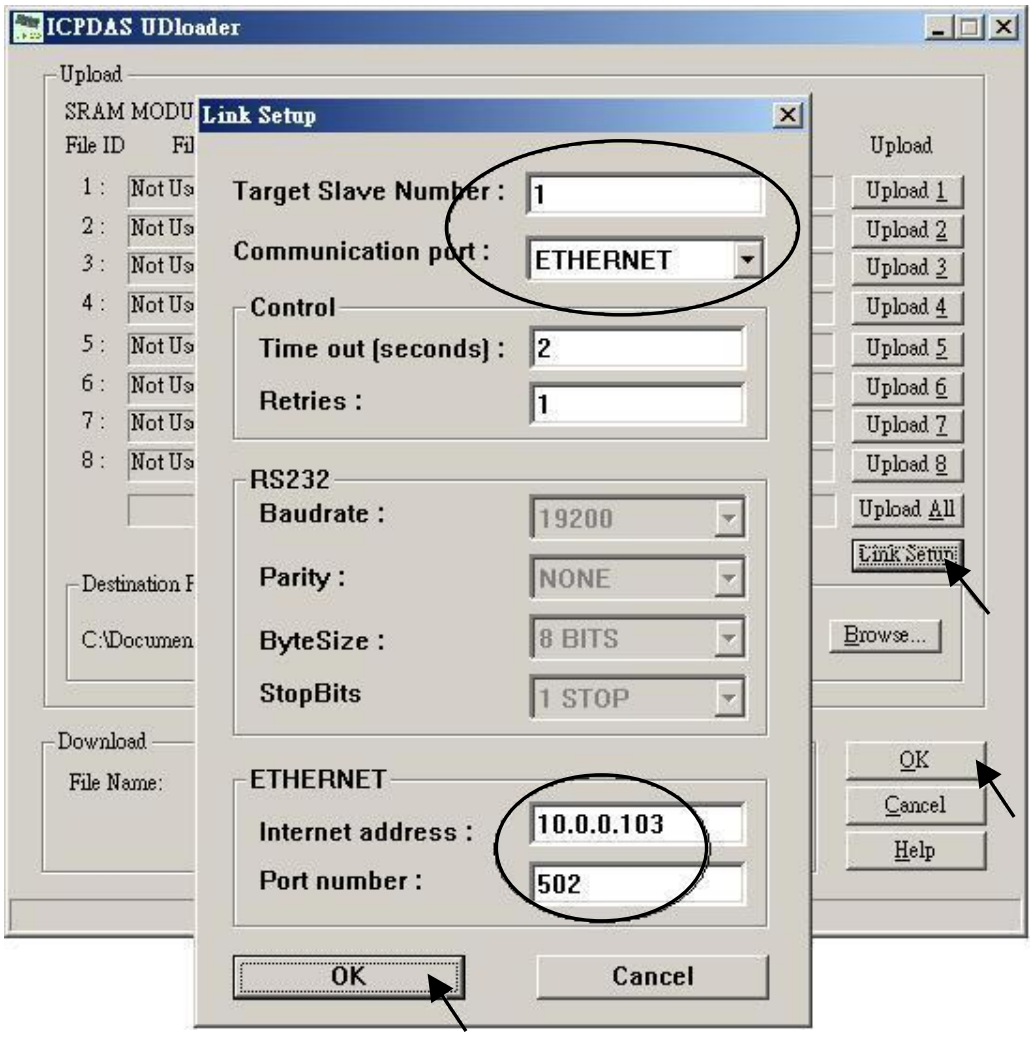
4. Whe recording is finished, please run UDLoader in your PC to upload the record file in the S-256/512 to PC.

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If your PC is currently running ISaGRAF workbench, please run “Tools” – “ICP DAS” – “ICPDAS UDloader”. Then you will see the windows listed in step (5).

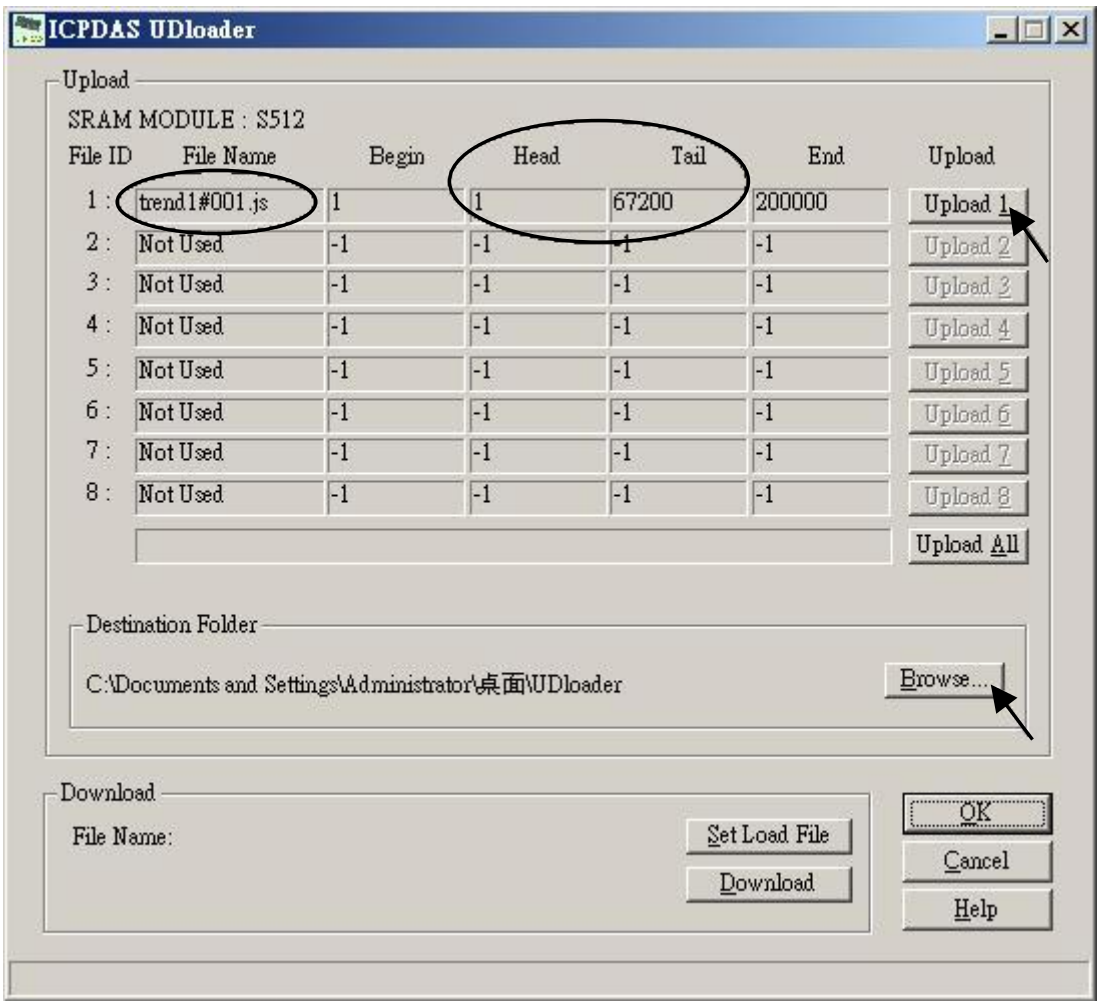


If your PC is not running ISaGRAF workbench, please copy “UDloader.exe” from the ‘..\faq058_demo\ vb6_demo_6’ folder to for example PC windows‘s desktop. Then please run it. Set proper “Link Setup” (If click on “Browse”, you may modify the file upload location path). Then click on “Ok” and “Ok” to save this setting, then run it again.



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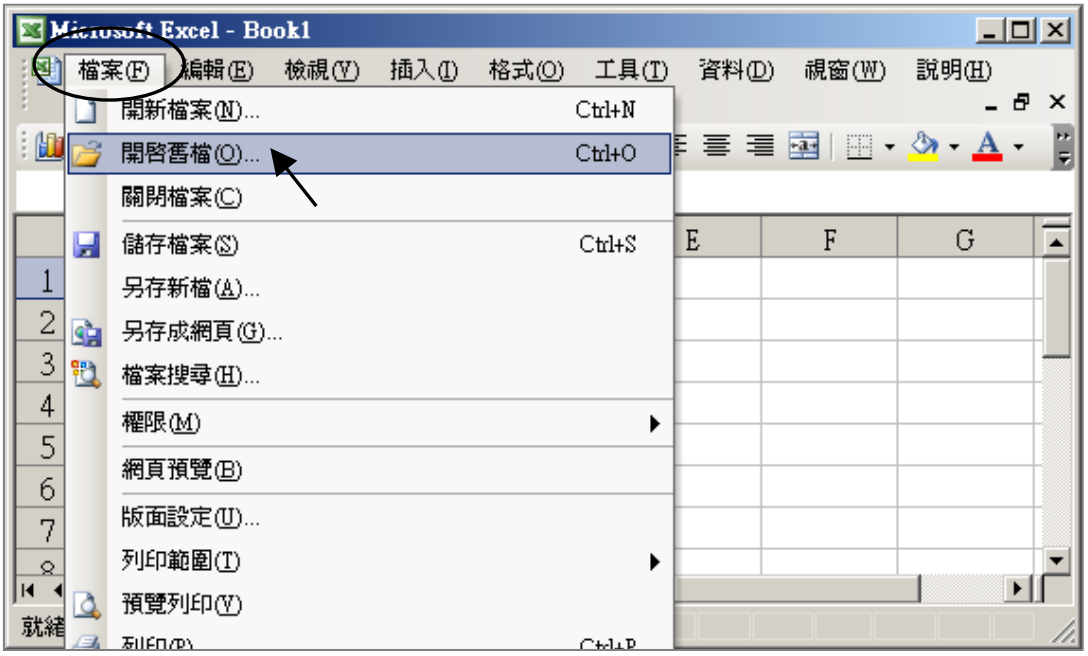
5. If the PAC is well connected, you will see a File Name displayed on the below window. Value of “Head” and “Tail” is the current size of the record file in the S-256/S-512. The below example shows 67,200 bytes. (Note: S-256/S-512 has size limitation, please refer to section 10.3 of the ISaGRAF user manual). you may modify the file upload location path by click on “Browse …”. Then please click on “Upload 1” to upload this record file to your PC.



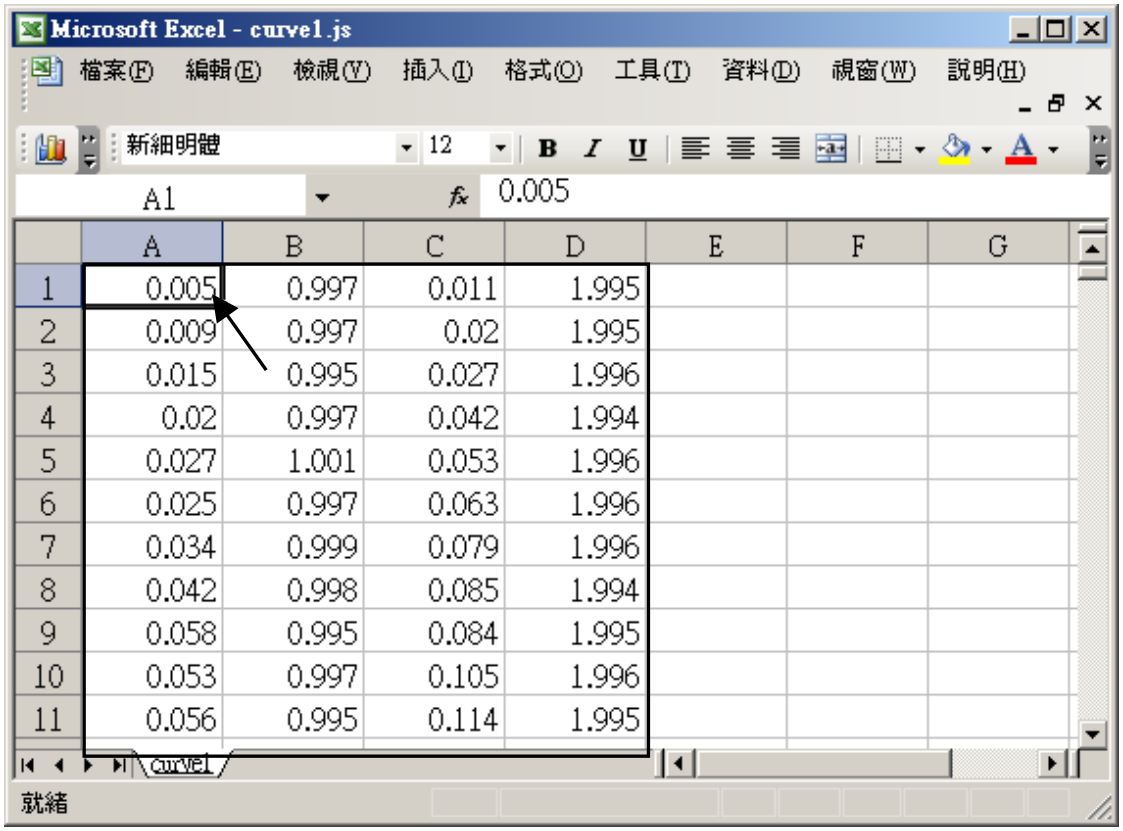
Then you may check if the record file is upload to your PC at the same path.

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6. Then please open this record file - “trend1.js” on M.S. Excel.



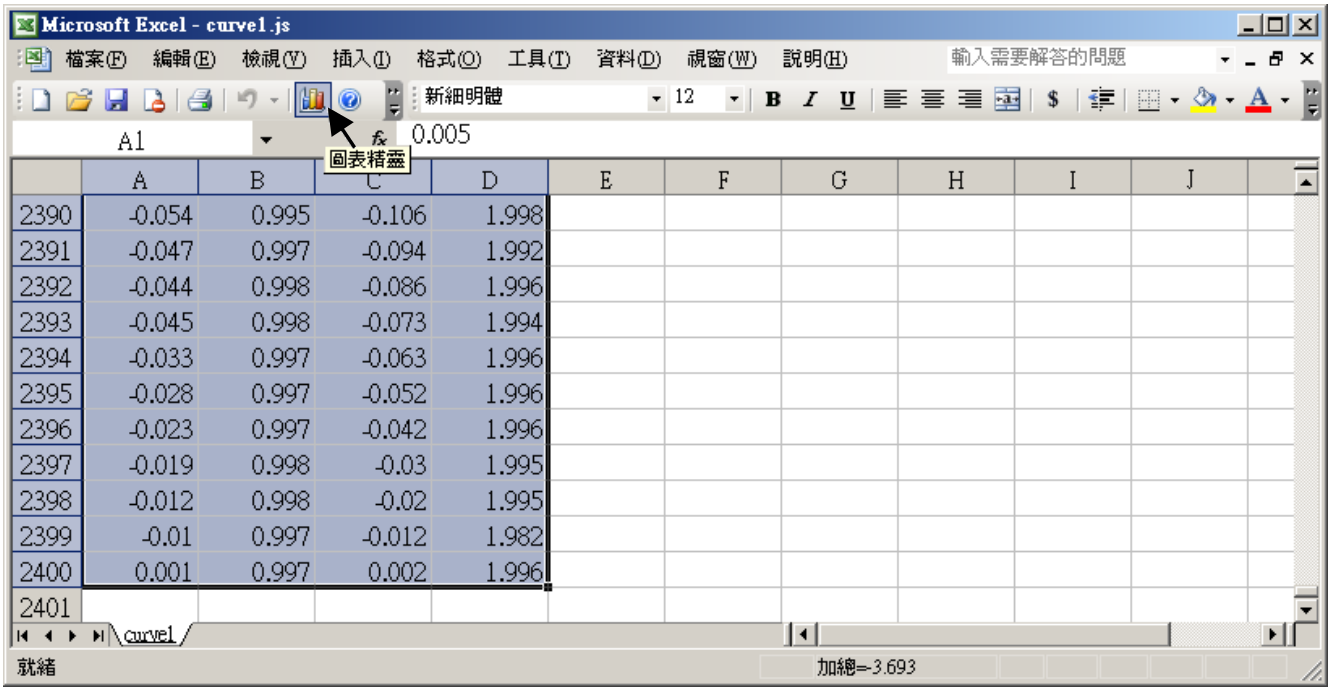
Please click on the first data at the left-top position. Then press and hold in “Shift”, and at the same time press “Ctrl” – “End”. You will see all data been selected.



	A	B	C	D
1	0.005	0.997	0.011	1.995
2	0.009	0.997	0.02	1.995
3	0.015	0.995	0.027	1.996
4	0.02	0.997	0.042	1.994
5	0.027	1.001	0.053	1.996
6	0.025	0.997	0.063	1.996
7	0.034	0.999	0.079	1.996
8	0.042	0.998	0.085	1.994
9	0.058	0.995	0.084	1.995
10	0.053	0.997	0.105	1.996
11	0.056	0.995	0.114	1.995

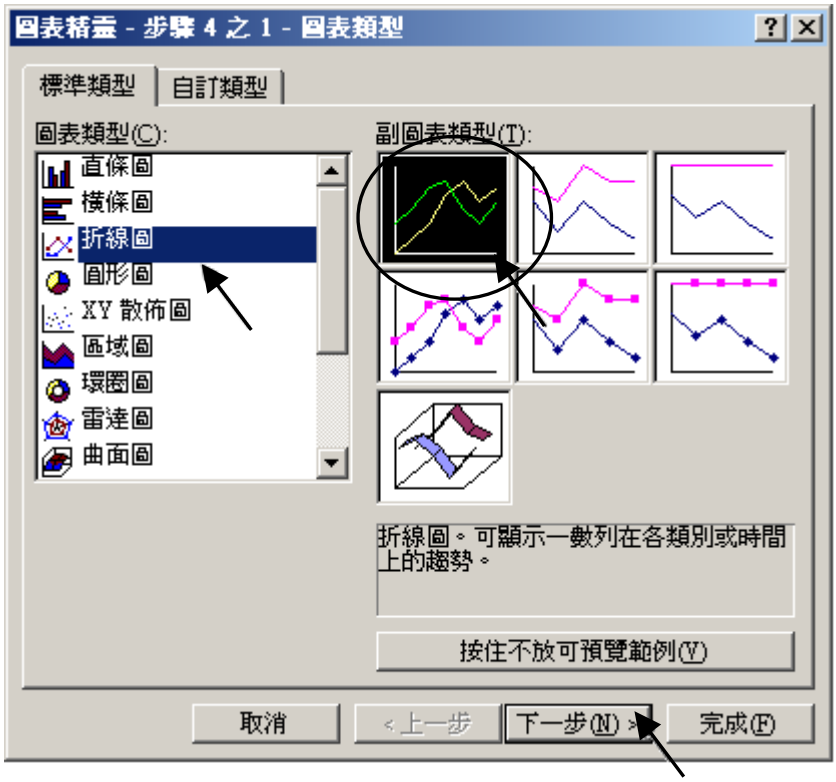
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Then click on **Chart Wizard**. 

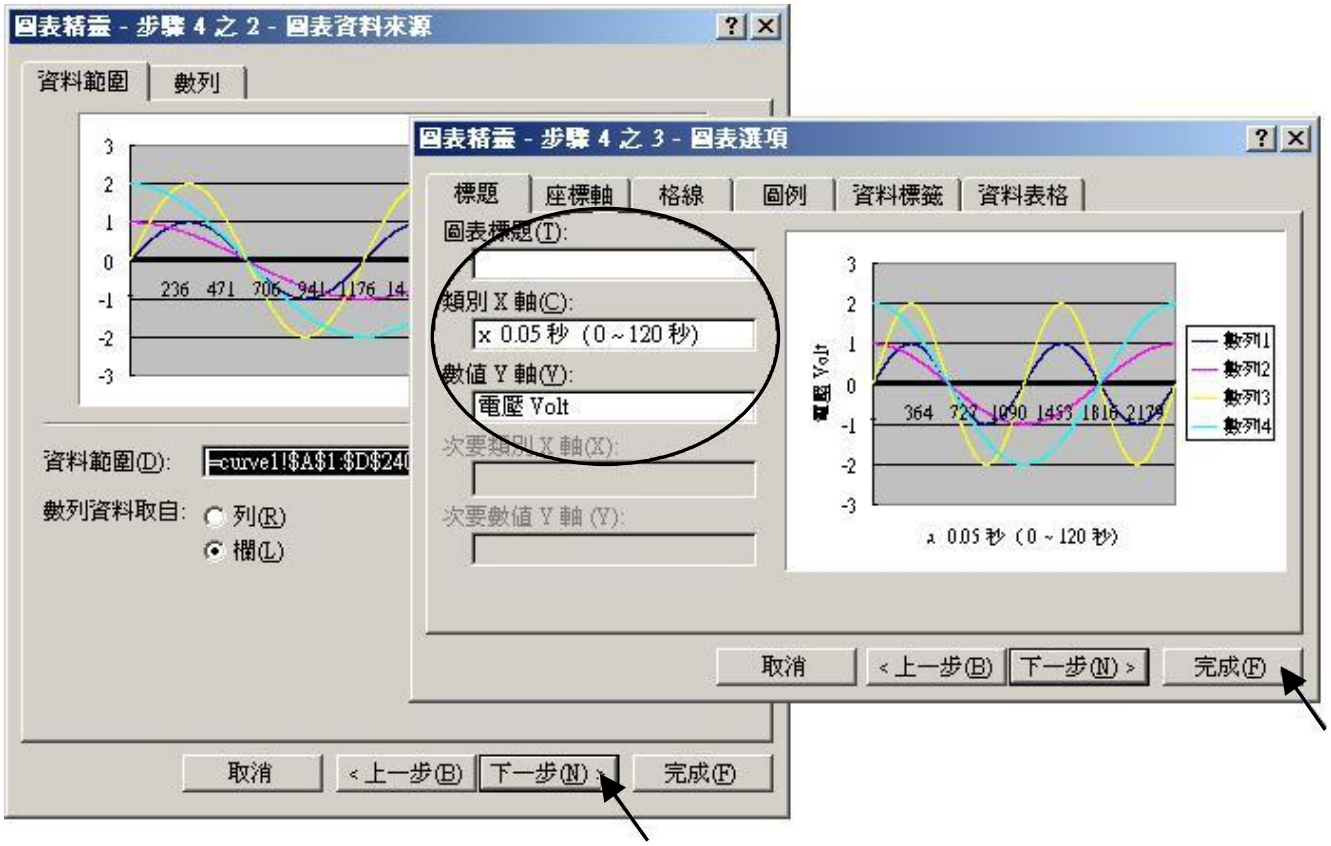


	A	B	C	D
2390	-0.054	0.995	-0.106	1.998
2391	-0.047	0.997	-0.094	1.992
2392	-0.044	0.998	-0.086	1.996
2393	-0.045	0.998	-0.073	1.994
2394	-0.033	0.997	-0.063	1.996
2395	-0.028	0.997	-0.052	1.996
2396	-0.023	0.997	-0.042	1.996
2397	-0.019	0.998	-0.03	1.995
2398	-0.012	0.998	-0.02	1.995
2399	-0.01	0.997	-0.012	1.982
2400	0.001	0.997	0.002	1.996
2401				

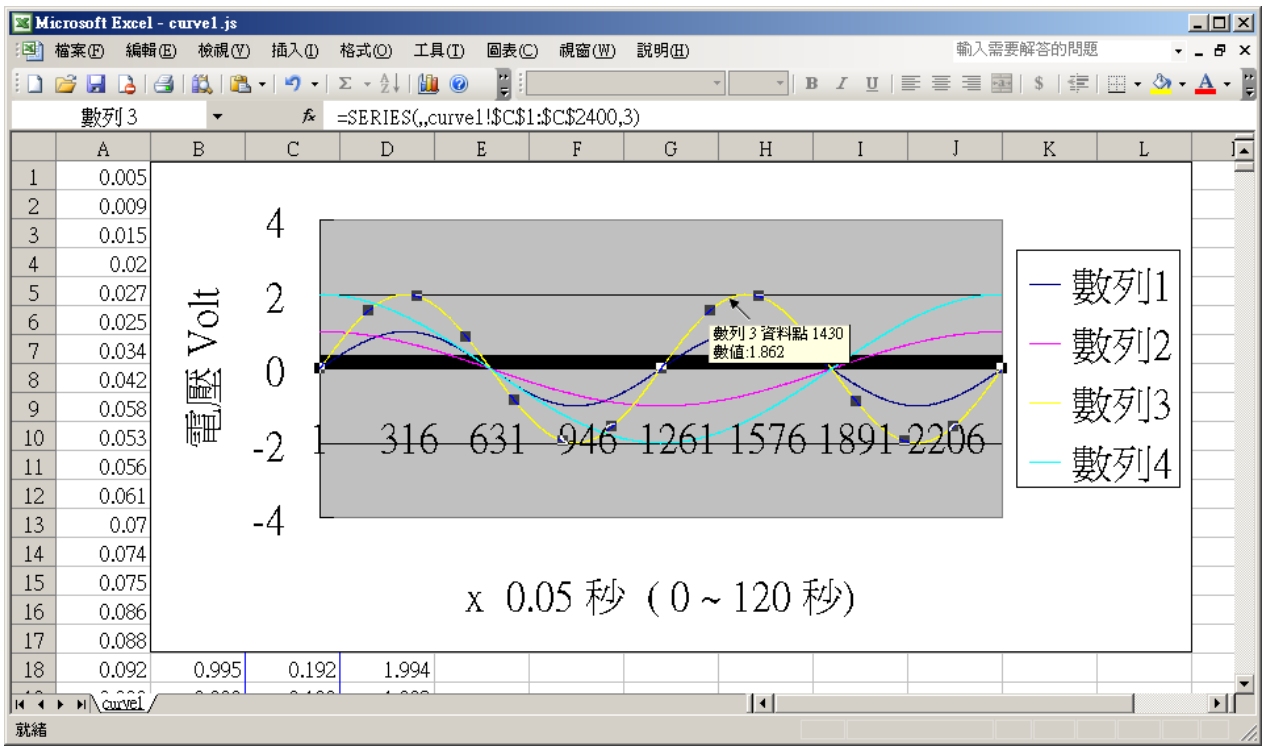
Please select the correct diagram on the left-hand side. And check the left-top type on the right-hand side. Then go Next .



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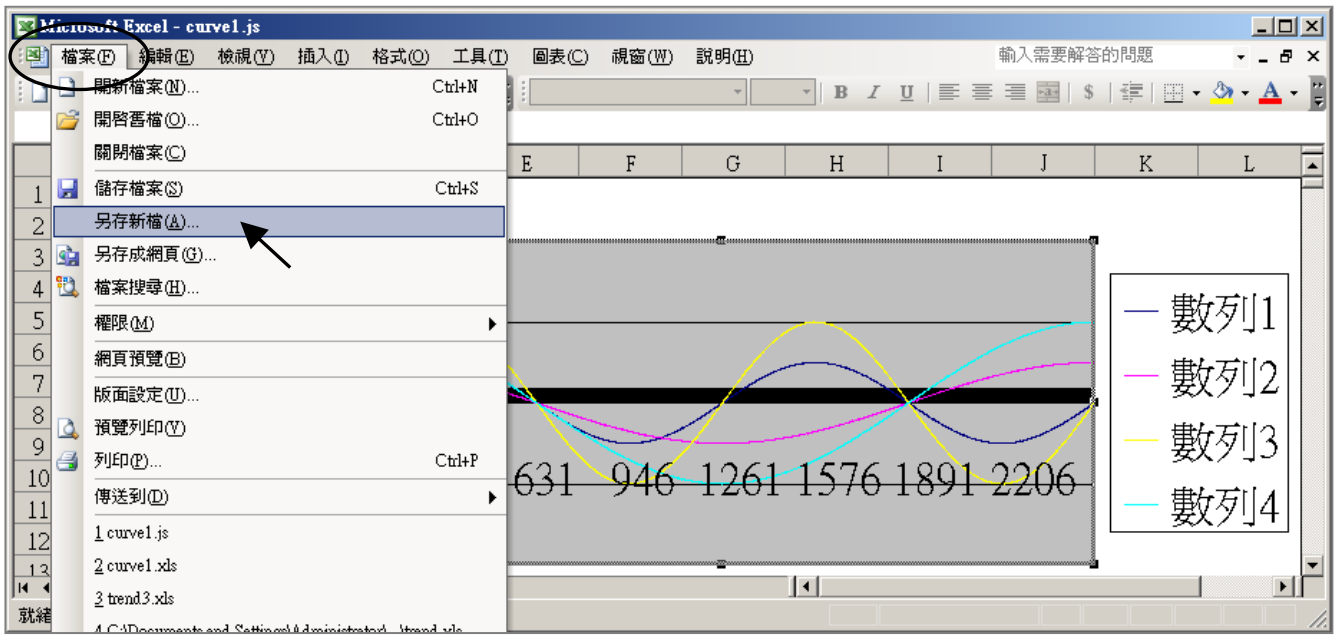


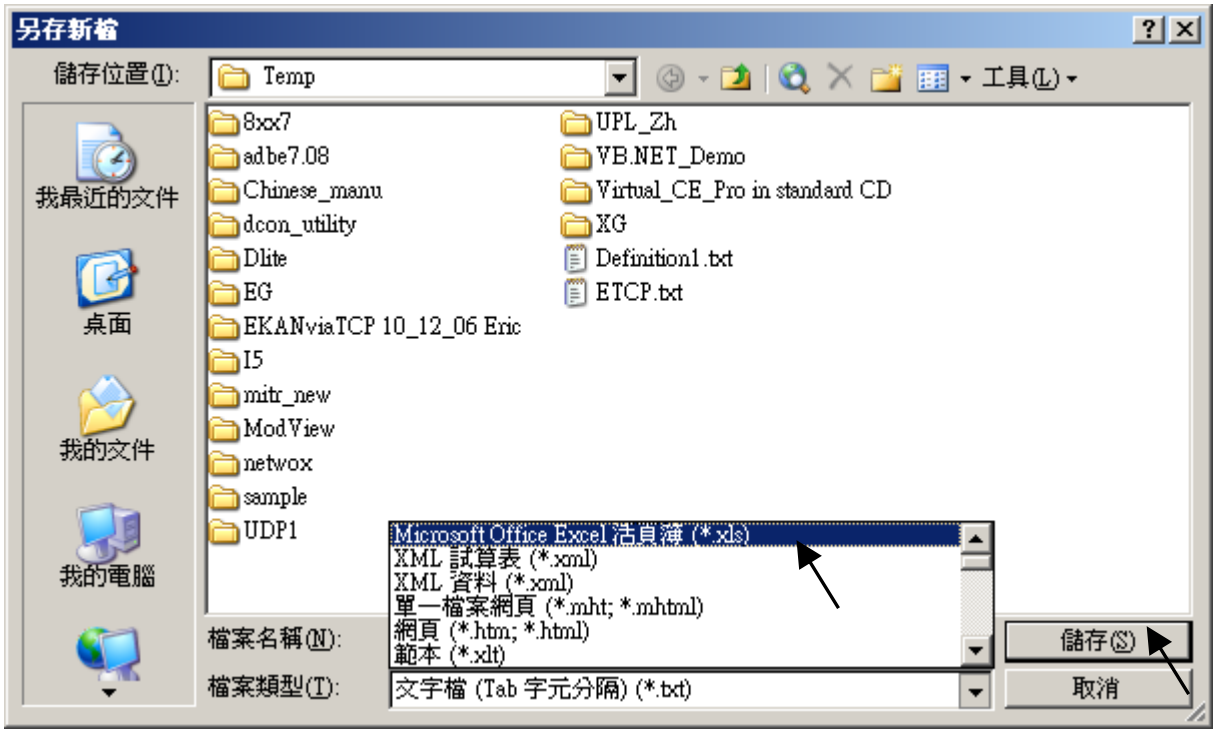
By the procedure, you will get the trend curve as the below window. You can modify its size, or check at any trend line. If you move your mouse to point at some position at the trend line, the related data is shown.



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Please save this trend curve diagram as a “Microsoft Office Excel (*.xls)” format. Then at any later time, you can open it to display the trend curve directly.

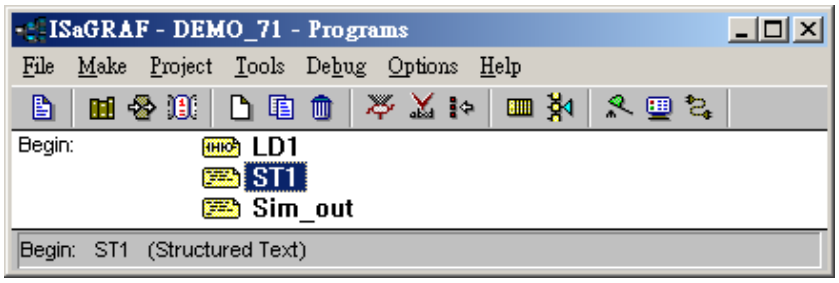




Note: The user can also exeute ‘Demo_6.exe’ in the ‘..\faq058_demo\vb6_demo_6’ folder on PC for operating with the connected ISaGRAF PAC.

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ISaGRAF project architecture:



Variable :

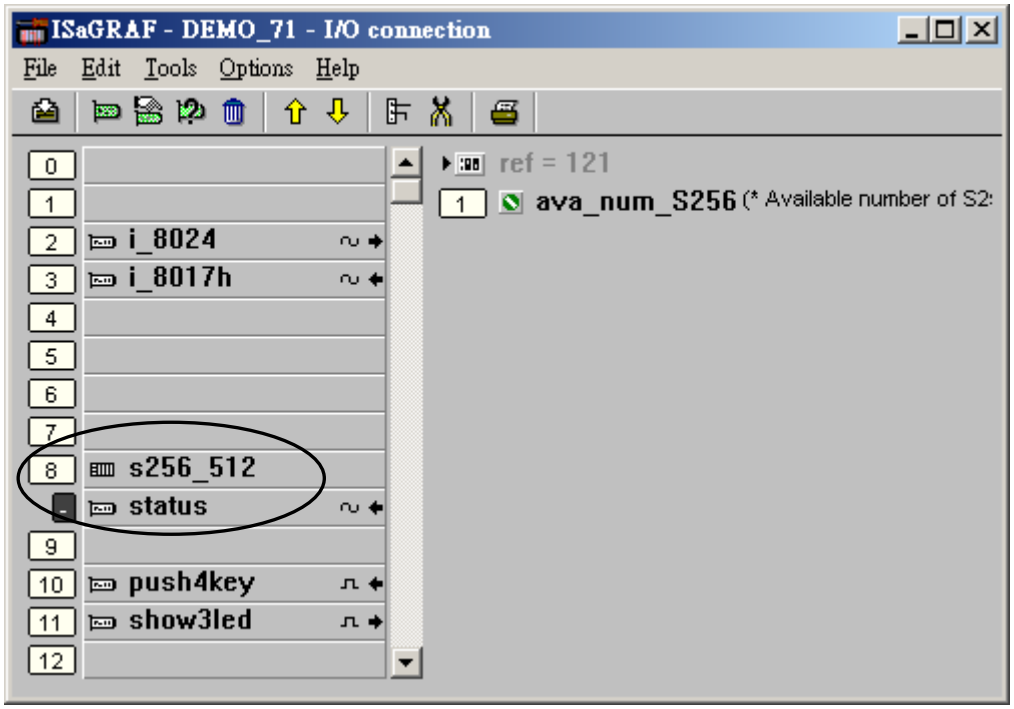
Please refer to section 2.6 of the ISaGRAF user manual or FAQ-039 for description of “Variable array”.

Name	Type	Attribute	Description
Go1	Boolean	**Internl**	Set as True to start, **addr defined as 21** (Hex. is 15)
Stop1	Boolean	**Internal**	Set as True to stop, **addr defined as 22** (Hex. is 16)
TMP	Boolean	**Internal**	Internal use
INIT	Boolean	**Internal**	Init as True
L1 , L2 , L3	Boolean	**Output**	connect to show3Led ’s Ch.1 to Ch.3
K1 , K4	Boolean	**Input**	Connect to push4key ‘s Ch.1 to Ch.4 Push K1 to start recording. K4 to stop
To_Blink	Boolean	**Internal**	To control blinking of the number on the front pannel
MUM_CH	Integer	**Constant**	How many chanels in I-8017H to record ? We use 4 channels in this demo (Ch.1 to 4)
Ava_num_s256	Integer	**Input**	Connect to “S256_512” ‘s Ch.1 . if value is 0, it means can not find S-256 / 512
Current_pos1	Integer	**Internal**	Current operating byte address in S-256/512
Len1 , TMP_V	Integer	**Internal**	Internal use
File_begin1 File_end1	Integer	**Constant**	The Begin & End byte address in the S-256/S-512 allocated for the record file
STEP1	Integer	**Internal**	Recording state. 0:No action , 1:recording , 2:finished
Period1	Integer	**Internal**	How long to record ? unit is minute, **addr as 3**
Interval1	Integer	**Internal**	How long to save a record ? unit is ms, **addr as 1**
Total_record1	Integer	**Internal**	How many records in this recording action? This value is calculated by the IsaGRAF program automatically. **addr declared as 5**

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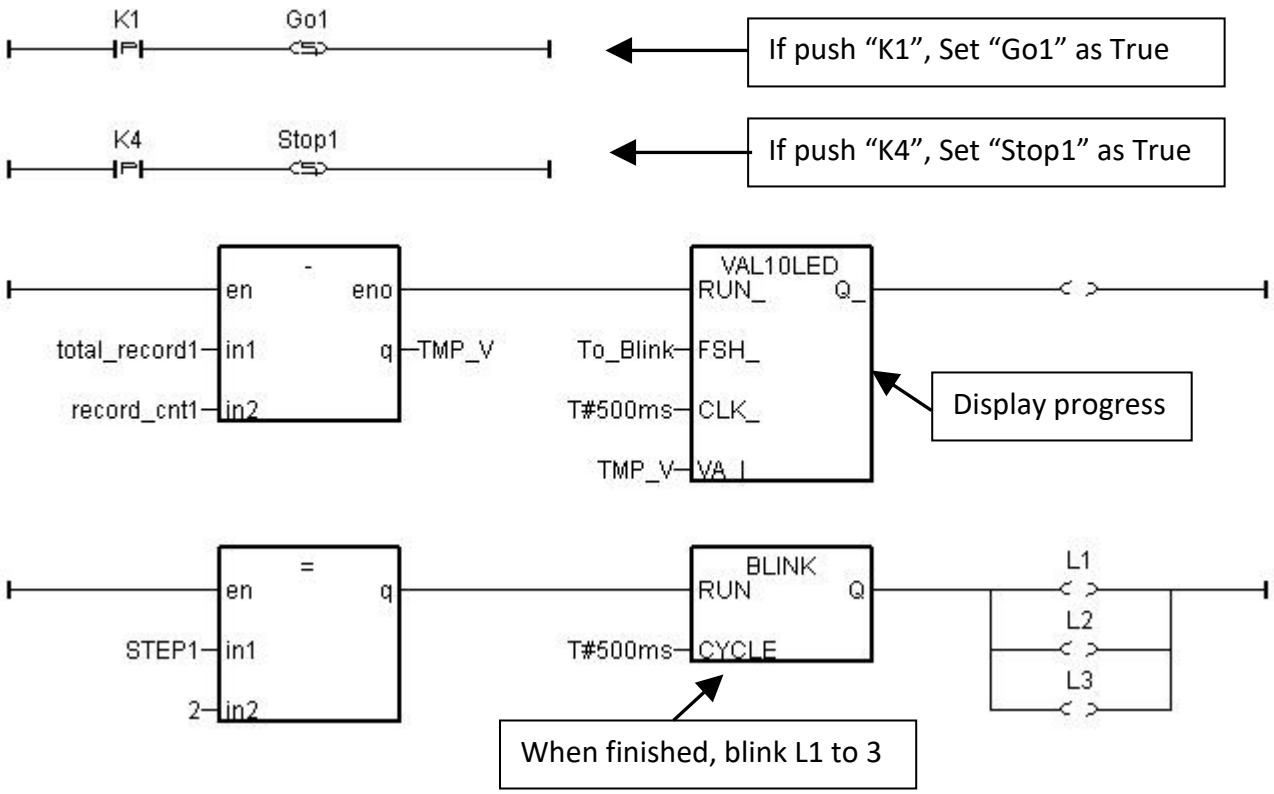
Record_cnt1	Integer	**Internal**	Current finished record count. **addr declared as 7**
ii	Integer	**Internal**	To use in “for” loops
i8017H[0..7]	Integer	**Input**	Variable array, Dim as 8. link to I-8017H ‘s Ch. 1 to Ch. 8
Volt1[0..7]	REAL	**Internal**	Variable array, Dim declared as 8. The voltage value converted from “i8017H[0..7]”
i8024[0..3]	Integer	**Output**	Variable array, Dim declared as 4. link to I-8024‘s Ch1 to Ch. 4
T1	Timer	**Internal**	For counting time
T1_next	Timer	**Internal**	The time to get and save next record
T1_Interval	Timer	**Internal**	The interval time between two record
Msg1	Message	**Internal**	Operation state message, Len is 255, init as “No Action now”, **addr as 41** (Hex. is 29)
Str1	Message	**Intenal**	Len is 255, internal use

IO connection:



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LD program – LD1



ST program – Sim_out

```
(* Output I-8024 ‘s Ch1    to Ch4 as different voltage curve *)

(*      2 * Pi * T1 / 60000     =    T1 * 1.047197E-4        *)
(*      2 * Pi * T1 / 120000    =    T1 * 5.235985E-5        *)

i8024[0]    :=    ANA(    sin( REAL(T1) *    1.047197E-4 ) * 3276.8    ) ;
i8024[1]    :=    ANA(    cos( REAL(T1) *    5.235985E-5 ) * 3276.8    ) ;
i8024[2]    :=    ANA(    sin( REAL(T1) *    1.047197E-4 ) * 6553.6    ) ;
i8024[3]    :=    ANA(    cos( REAL(T1) *    5.235985E-5 ) * 6553.6    ) ;
```


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ST program – ST1

```
if     INIT     then
       INIT   :=   FALSE   ;        (* set as False to only do it once at 1st PLC scan *)
       if      ava_num_S256   =   0     then        (* S256 / S512 is not installed in I-8xx7, return *)
            Msg1   :=   'S256 / S512 is not installed in I-8xx7 controller !'   ;
            Return   ;
       end_if   ;

       (* Allocate S256/512 memory of byte No.1 to 200,000 for file ID = 1 , name='trend1.js' *)
       TMP := S_FL_INI( 1 , 'trend1.js' , File_begin1 , File_end1)   ;
       TMP := S_FL_AVL( 1 , -1 , -1 ) ;     (* Init file content as No data at the beginning *)
end_if   ;

if     ava_num_S256   = 0   then       (* S256 / S512 is not installed in I-8xx7, return *)
   return ;
end_if   ;

(* If Stop1 is set to TRUE, stop the T1 timer and set STEP1 as 0 *)
if     Stop1     then
   Stop1   :=   False   ;
   STEP1    :=   0   ;            (* 0: no action *)
   TStop(T1)    ;                 (* stop T1 *)
   T1 := T#0s   ;
   Msg1   :=   'User stop recording !'   ;
   To_Blink   :=   False   ;       (* Set as FALSE not to blink the display value *)
end_if   ;

(* Get file status in S256 or S512 *)
(* -1: PC hasn't load the file yet *)
(* others: the end byte No. that PC has load the file *)

TMP_V   :=   S_FL_STS( 1 ) ;
if     TMP_V   <>   -1   then     (* PC has load the file *)
       TMP   :=   S_FL_RST( 1 ) ;   (* reset status to -1 that indicates PC hasn't load the file yet *)
end_if   ;
```


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```
(* If start command is gived *)
if   Go1   then
     Go1 := False ;

     (* STEP1 :   0: no action , 1: recording , 2: recond finished *)
     if     STEP1=1     then
               (* It is still recording now *)
          Msg1   :=   'It is still recording now ...'   ;
     else
          (* Check interval valid or not *)
          (* we assume 25 to 10000 ms is valid in this example *)
          (* If your average PLC scan time is larger, for example, near 20 ms,
                Please use Interval larger than 25 ms. Or the record time won't be correct *)
          if     (Interval1 < 25)   or   (Interval1 > 10000)   then
            Msg1   :=   'Wrong Interval value, it should be in 25 to 10000 milli-second !' ;

          (* Check period valid or not *)
          (* we assume 1 to 10 minute is valid in this example *)
          Elsif   ( Period1 < 1)     or   (Period1 > 10)   then
            Msg1   :=   'Wrong Period value, it should be in 1 to 10 minute !' ;

          else
            (* parameter is correct, start recording *)
            total_record1 := (Period1 * 60000) / Interval1 ;    (* calculate total record number *)
            record_cnt1 := 0 ;   (* reset current record count as 0 *)
            STEP1 := 1 ;            (* set step as 1:recording *)
            Msg1   :=   'Recording now ...'   ;

            (* start ticking T1 from 0 second *)
            T1 := T#0s ;
            T1_Interval   :=   TMR(Interval1) ;
            T1_next := T1 + T1_Interval ;
            TStart(T1) ;              (* ticking now *)
            Current_pos1 := 1 ;   (* reset current data position in S256/S512 as 1 *)
            To_Blink := TRUE ;      (* Set as TRUE to blink the display value *)

          end_if   ;
     end_if   ;
end_if   ;
```


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```
(* in reconrding state *)
if      STEP1=1       then

   (* store one record *)
   if     T1 >=    T1_next     then

      (* Re-calculate next T1 *)
      T1_next    :=    T1_next    +    T1_Interval ;

      (* T1 will be overflow after T#23h59m59s999ms, so reset it at T#20h *)
      if     T1 >= T#20h     then
        T1    :=     T#0s ;
        T1_next     :=     T1 + T1_Interval ;
      end_if ;

      str1    :=    '' ;   (* init str1 as empty string *)
      for      ii    :=    0    to    NUM_CH-1    do

          (* convert i8017H analog input value to Volt value *)
          Volt1[ii]    :=    Real(i8017H[ii]) * 0.000305176 ;       (* 10.0 / 32768 = 0.000305176 *)
          str1    :=    str1 + Rea_Str2(Volt1[ii] , 3) +    '$09' ;      (* delimiter is <TAB> character *)

      end_for ;

      str1    :=    str1 + '$0D$0A'    ;    (* add <CR> <LF> at the end of each row *)
      Len1    :=    MLEN(str1) ;          (* get string length *)

      (*    data number larger than file's max. allocated memory    *)
      if     (Current_pos1 + Len1 - 1)    >    File_end1      then
          STEP1 := 0;              (* 0: no action *)
          Msg1 := 'File allocated memory is not enough to hold the data ! '    ;
          Tstop(T1) ;
          T1 := T#0s ;
          To_Blink := FALSE ;    (* Set as FALSE not to blink the display value    *)
          Return ;
      end_if    ;
```


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```
    TMP   :=   S_M_W( Current_pos1 , Len1 , str1 ) ;   (* write all bytes in str1 to S256/S512 *)
    Current_pos1   :=   Current_pos1 + Len1 ;          (* Current position move on *)
    TMP := S_FL_AVL( 1 , 1 , Current_pos1-1 ) ;        (* Re-caculate File 's Head & Tail *)


  (* Check if record number reach the end *)
    record_cnt1   :=   record_cnt1 + 1 ;   (* current record count plus 1 *)
    if    (record_cnt1 >= total_record1)    then
        STEP1   :=   2   ;          (* 2: recond finished *)
        Msg1 :=   'Record is finished ! You may download the record file to your PC now !' ;
        Tstop(T1)   ;
        T1   :=   T#0s    ;
        To_Blink   :=    FALSE ;   (* Set as FALSE not to blink the display value *)
    end_if ;
  end_if ;
end_if   ;
```

Click the link for more ISaGRAF FAQ:
http://www.icpdas.com/en/faq/index.php?kind=280#751

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