The Soft-GRAF Application: Alarm Lists

This paper lists the way to use the Soft-GRAF HMI software to build an alarm-list application in the ISaGRAF WinCE PAC.

1.1. Download Demo Programs and Documents

The following driver versions of ISaGRAF WinCE PAC support the Soft-GRAF HMI. They can run the Soft-GRAF demo program included in this FAQ-160.

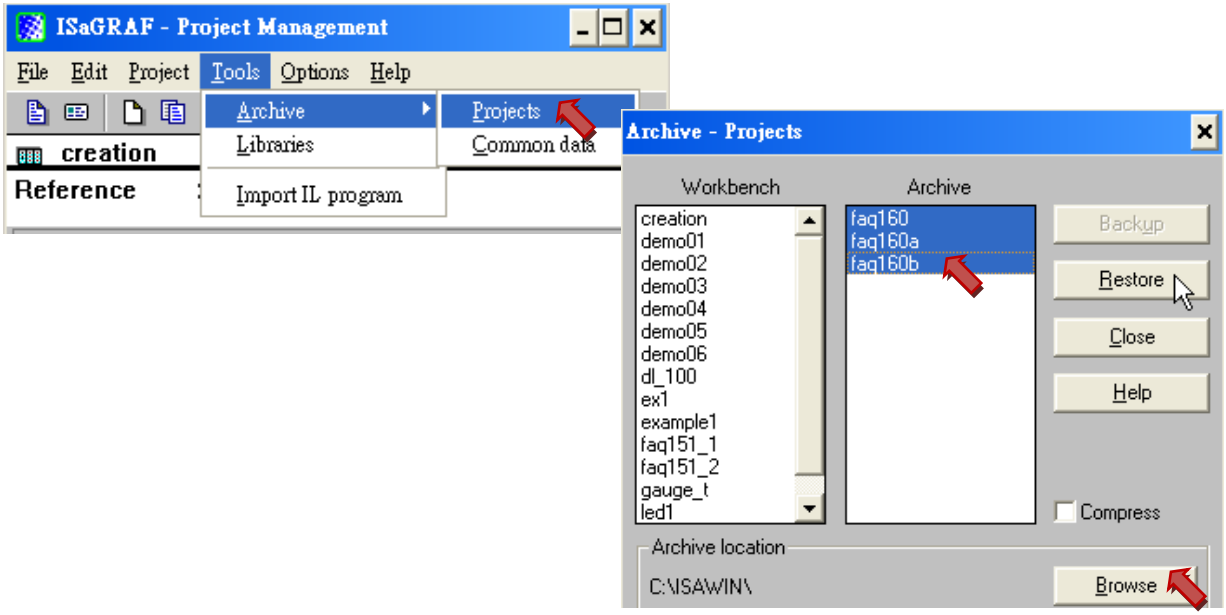
ISaGRAF PAC	ISaGRAF Driver Version
WinCE PAC:	
XP-8xx7-CE6	1.33 or later version
XP-8xx7-Atom-CE6	1.01 or later version
WP-8xx7	1.53 or later version
WP-5147	1.02 or later version
VP-25W7/23W7	1.45 or later version

Download the ISaGRAF Driver:

If your driver version is an earlier one, you may download the new ISaGRAF Driver from www.icpdas.com > ISaGRAF SoftLogic PAC > Driver and then follow the attached document to update it to your ISaGRAF PAC.

Download the ISaGRAF Demo Project:

This paper is the ISaGRAF FAQ-160. User can download the document, ISaGRAF demo (faq160.pia, faq160a.pia, faq160b.pia) and Soft-GRAF demo programs (FAQ160, FAQ160A, FAQ160B) from http://www.icpdas.com/faq/isagraf.htm **> 160** (faq160_demo.zip). Then, unzip the file and restore these demo programs to the PC/ISaGRAF.



1.2. Description of Demo Programs

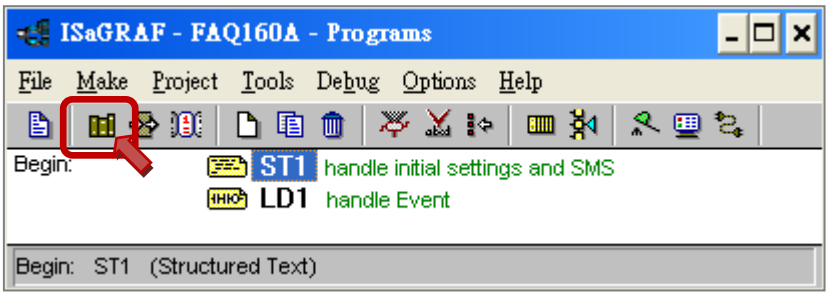
This FAQ-160 provides demo programs as the following table.

ISaGRAF	Soft-GRAF	Description
faq160.pia	FAQ160	For Alarm Lists (No SMS function)
faq160a.pia	FAQ160A	For Alarm Lists (It sends short message to 1 cell. phone)
faq160b.pia	FAQ160B	For Alarm Lists (It sends short message to 5 cell. phones)

Now, we will focus on "FAQ160A" to explain this demo program.

1.2.1. Description of the ISaGRAF Program (faq160a.pia)

Project Architecture*:* There is one Ladder and one ST program in this project.



ISaGRAF Variables:

Name	Type	Attribute	Description
Event1	Boolean	Internal	Set "True" to trigger an Alarm without pop-up dialog.
Event2	Boolean	Internal	Set "True" to trigger an Alarm with a pop-up dialog.
Event3	Boolean	Internal	Set "True" (hold on True for 5 seconds) to trigger an Alarm.
INIT	Boolean	Internal	Set its initial value as"TRUE.
TMP	Boolean	Internal	For temporary usage.
Alarm_bit	Boolean	Internal	**Addr. = 11**, In this demo, it is used for the HMI object - "g_Alarm".
SMS_available	Boolean	Input	1st Channel in the ISaGRAF – "I/O connection > SMS" window. The value must be "TRUE" to be able to send SMS. If the value is "False", it could be: 1. COM Port error (In the "I/O connection" window) 2. Without installing the 3G I/O card or SIM card. 3. Without configuring the I/O card with Utility. 4. Poor network signal

M5	Boolean	Internal	M5 is triggered automatically when the Event5 happens.
save_phone	Boolean	Internal	**Addr. = 31**, set “TRUE” to save phone number to a file. In this demo, it is used for the “Save button (g_B_Inp)”.
need_retry1	Boolean	Internal	-
Val_4	Integer	Internal	Set larger than 1000 to trigger the Event4.
Val_4_old	Integer	Internal	Old value of Val_4.
Val_5	Integer	Internal	Set larger than 1000 for 5 more seconds to trigger the Event5.
File1	Integer	Internal	A file handles for saving phone numbers.
SMS_status	Integer	Internal	0: Sleep, 1: Busy, 21: Succeed, -1: SMS not ready, -2: Timeout
SMS_Step	Integer	Internal	1: 1st phone, 2: 2nd phone, 3: 3rd phone ..., Set its initial value as “1”..
SMS_Step2	Integer	Internal	0: before sending SMS, 1: sending SMS
How_many_phone	Integer	Internal	Amount of cell. Phone, this demo (FAQ160A) is “1”.
ReTry_count	Integer	Internal	Retry count for sending short message
ftp_year	Integer	Internal	**Addr. = 21**, for "ftp_Loader.exe".
ftp_month	Integer	Internal	**Addr. = 22**, for "ftp_Loader.exe".
ftp_day	Integer	Internal	**Addr. = 23**, for "ftp_Loader.exe".
ftp_command	Integer	Internal	**Addr. = 24**, set “1” to let Soft-GRAF to send a file (then auto reset as 0).
ftp_result	Integer	Internal	**Addr. = 25**, 1: Busy, 21: Succeed, 101: No File, 102: FTP Fail, 103: FTP Disabled.
ftp_progress	Integer	Internal	**Addr. = 26**, the progress is 0 to 100.

ReTry_Timer	Timers	Internal	Timer for Retry. Set its initial value as “T#0s”.

msg_01	Messages	Internal	Alarm message 1. Set its max. length as “255”.
msg_02	Messages	Internal	Alarm message 2. Set its max. length as “255”.
msg_03	Messages	Internal	Alarm message 3. Set its max. length as “255”.
msg_04	Messages	Internal	Alarm message 4. Set its max. length as “255”.
msg_05	Messages	Internal	Alarm message 5. Set its max. length as “255”.
File_name1	Messages	Internal	The file name for saving phone numbers. Set its max. length as “255”.

Phone_number	Messages	Internal	Current processing cell. phone number. Set its max. length as “32”.
Phone_number1	Messages	Internal	**Addr. = 1**, cell phone number, uses your own number. In “FAQ160A” demo, it used for the “Message Input button (g_M_Inp)” in the Soft-GRAF Studio. Set its max. length as “32”.

ST1 Program:

```
(* operation in the 1st scan cycle. Pls declare INIT to have an initial value TRUE *)
if   INIT   then

   INIT := False ;

   (* Set your own message here, accept local language *)
   msg_01 := 'Event1 !' ;
   msg_02 := 'Event2 !' ;
   msg_03 := 'Event3 !' ;
   msg_04 := 'Event4 !' ;
   msg_05 := 'Event5 !' ;

   (* Load Phone number from a file. *)
   (* ------------------------------------------------------------ *)
   (* file name for saving the Cell. phone number. for example '\System_Disk\cell_phone.txt' *)
   File_name1 := '\System_Disk\cell_phone.txt' ;
   File1 := f_ropen(File_name1);
   if   File1 <> 0   then
      (* open file ok *)
      Phone_number1 := FM_READ(File1) ;
      TMP := F_CLOSE(File1) ;
   end_if ;
   (* ------------------------------------------------------------ *)

end_if ;


(* Save Phone number to File_name1 when Save_Phone is triggered *)
(* ------------------------------------------------------------ *)
if   Save_Phone   then
   Save_Phone := False ;
   if   F_Exist(File_name1)   then
      (* file exists, open it in write mode *)
      File1 := f_wopen(File_name1);
```

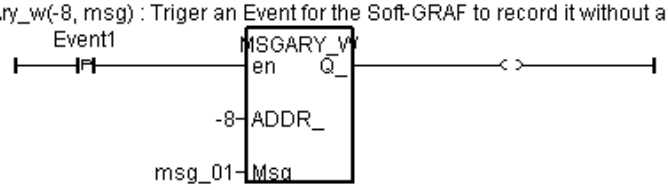
```
    else
       (* file doesn't exist, create it in Read and Write mode *)
       File1 := f_creat(File_name1);
    end_if ;
    if    File1 <> 0    then
       (* open file ok *)
       TMP := FM_WRITE(File1 , Phone_number1 ) ;
       TMP := F_CLOSE(File1) ;
    end_if ;
end_if ;
(* ---------------------------------------------------------- *)


(*
Get message sending status every scan cycle.
Message sending status:
     0: waiting for a new sending request.
     1: busy. (message is processing now)
   21: The message is sent successfully.
   -1: SMS system is not available
   -2: Timeout, No response.
*)
SMS_status:= SMS_STS() ;


(*
If Send SMS succeed, process the next phone number.
If send SMS_fail, set this phone need retry.
*)
if    (SMS_Step2 = 1) then       (*    1: sending SMS ... *)
   (* SMS sending finished *)
   if    (SMS_status = 21)    or    (SMS_status < 0)    then
      SMS_Step2 := 0 ;      (* reset as 0: before sending SMS *)
      if    SMS_status < 0    then
         (* send fail, set need-to-retry *)
         case    SMS_Step    of
            1:    (* 1st phone *)
               need_retry1 := TRUE ;
         end_case ;
      end_if ;
      (* next phone *)
      SMS_Step := SMS_Step + 1 ;
      if    SMS_Step > How_many_phone    then
```

```
        (* All phones are processed, reset as 1 *)
        SMS_Step := 1;
      else
        (* still has some phone to process, trigger M5 to process the next phone *)
        M5 := True ;
      end_if ;
end_if ;
end_if ;


(* If sending Short Message fail, try again 1 minute later *)
(*
   SMS_Step :    1: 1st phone, 2: 2nd phone, 3: 3rd phone ... , init as 1
   SMS_Step2:    0: before sending SMS, 1: sending SMS, init as 0
*)
if   (ReTry_count < 1)   then
   if   (SMS_Step = 1)   and   (SMS_Step2 = 0)   then
      (* some phone sends fail, need to retry *)
      if   need_retry1   then
        (* start ReTry_timer to tick to 1 minute *)
        ReTry_timer := T#0s ;
        tStart(ReTry_timer) ;
        (* set new value to ReTry_count *)
        if   ReTry_count < 0   then
          (* for safety *)
          ReTry_count := 1 ;
        else
          ReTry_count :=   ReTry_count + 1 ;
        end_if ;
     end_if ;
   end_if ;
end_if ;
(*   Retry it when Timer reaches 1 minute later *)
if   ReTry_timer >= T#60s   then
   (* trigger M5 to try again *)
   M5 := TRUE ;
   tStop(ReTry_timer) ;     (* stop ticking *)
   ReTry_timer := T#0s ;    (* reset as 0 second *)
end_if ;

(*
Pls refer to http://www.icpdas.com/faq/isagraf.htm > FAQ-111 for more information about SMS.
Please set the message variable "SMS_receiver" to your own cell. phone number.
```

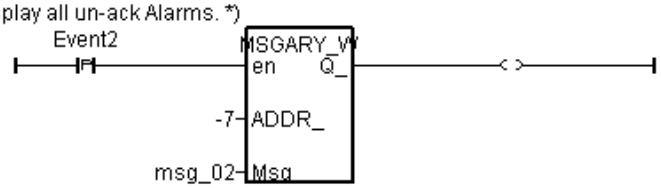
```
This demo uses an I-8212W-3GWA card in the slot 0 of the VP-2xW7. So the COM port number is 5
in the IO connection > SMS. If your PAC is not using COM5, please modify it.
*)
if   M5   then

   (* M5 is triggered automatically when the Event5 happens. *)
   M5 := False ;

(* Send a Short Message to a cell. phone with a local language.
Pls refer to http://www.icpdas.com/faq/isagraf.htm > FAQ-111 for more information about SMS. *)
   case   SMS_Step   of
      1:   (* 1st phone *)
           Phone_number := Phone_number1 ;
           need_retry1 := FALSE ;     (* No more retry *)
   end_case ;
   TMP := SMS_send('L' + Phone_number ,
'004500760065006E007400350020006800610070007000650065006E007300200021');
   SMS_Step2 := 1;   (* set as 1: sending SMS *)

end_if ;
```

LD1 Program:

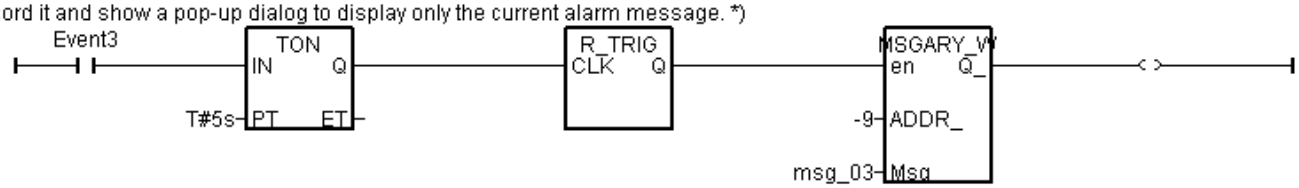
(* MsgAry_w(-8, msg) : Triger an Event for the Soft-GRAF to record it without a pop-up dialog. *)



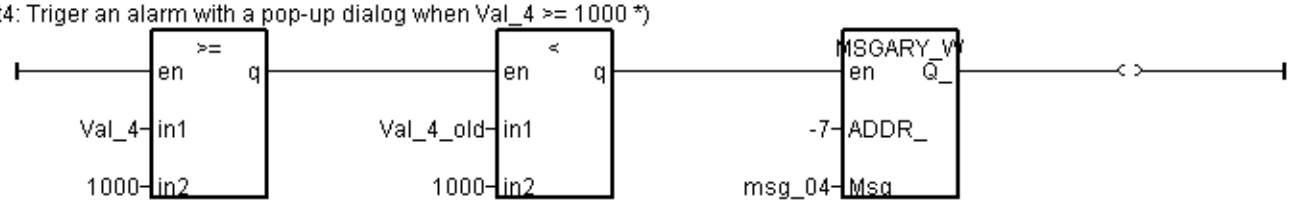
(* MsgAry_w(-7, msg) : Triger an Event for the Soft-GRAF to record it and show a pop-up dialog to display all un-ack Alarms. *)



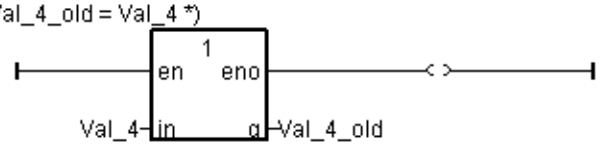
(* MsgAry_w(-9, msg) : Triger an Event and hold on TRUE for at least 5 seconds for the Soft-GRAF to record it and show a pop-up dialog to display only the current alarm message. *)



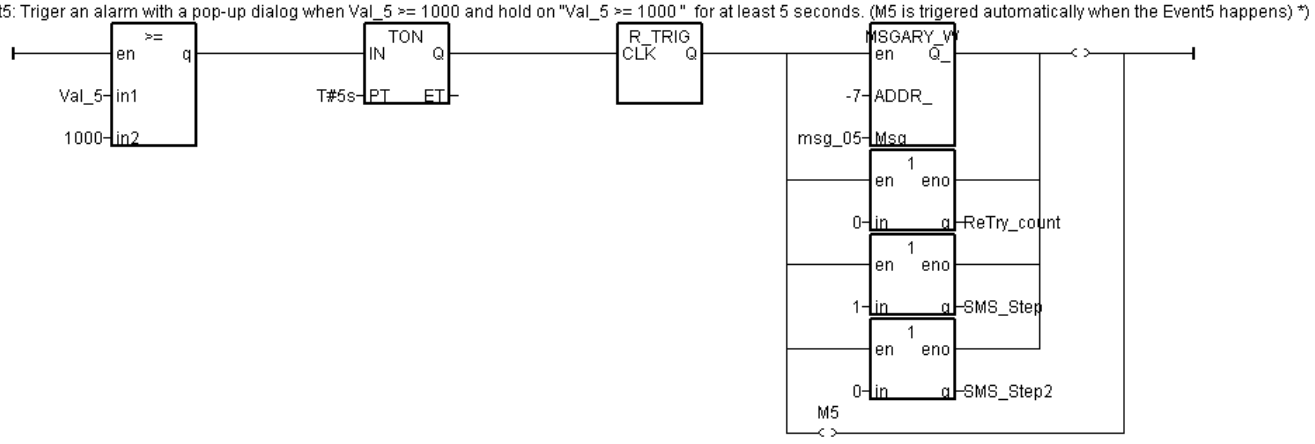
(* Event4: Triger an alarm with a pop-up dialog when Val_4 >= 1000 *)



(* Let Val_4_old = Val_4 *)



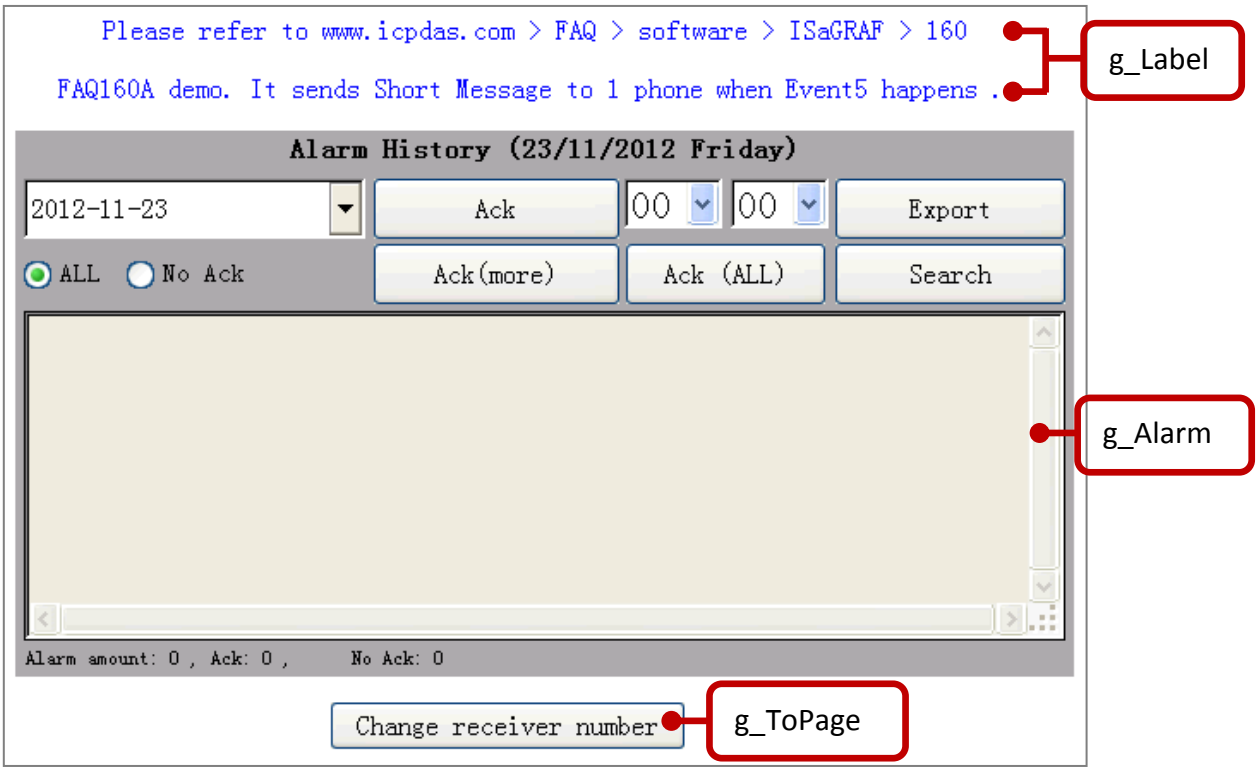
(* Event5: Triger an alarm with a pop-up dialog when Val_5 >= 1000 and hold on "Val_5 >= 1000 " for at least 5 seconds. (M5 is trigered automatically when the Event5 happens) *)



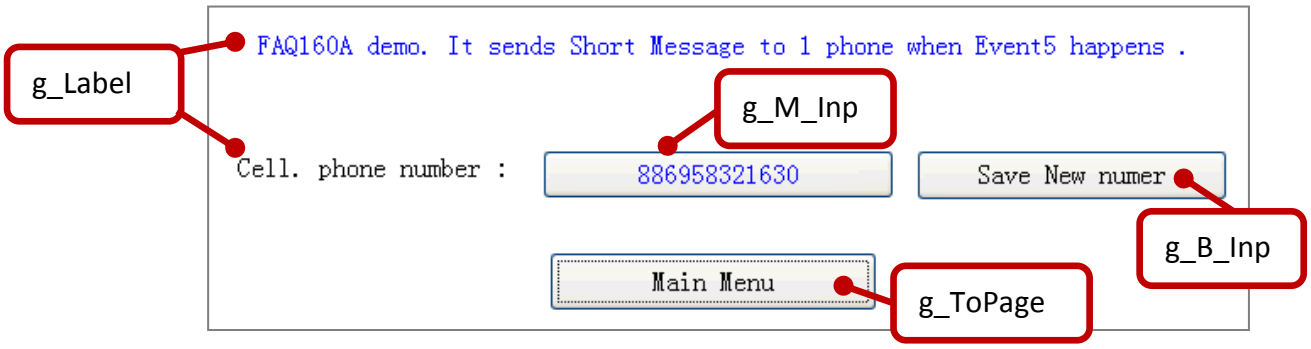
1.2.2. Description of the Soft-GRAF HMI Project (FAQ160A)

Soft-GRAF Studio HMI:

Page1:
This page includes four HMI objects:
g_Label : To show the text - “Please refer to www.icpdas.com > FAQ > software > ISaGRAF > 160”.
g_Label : To show the text -
“FAQ160A demo. It sends Short Message to 1 phone when Event5 happens.”
g_Alarm : To show the alarm lists.
g_ToPage : To switch to the Page2.



Page2:
This page includes five HMI objects:
g_Label : To show the text -
“FAQ160A demo. It sends Short Message to 1 phone when Event5 happens.”
g_Label : To show the text - “Cell. phone number : ”
g_M_Inp : To fill out the cell. Phone number.
g_B_Inp : To save the cell. Phone number.
g_ToPage : To switch to the Page1.



If the user is not familiar with the “Soft-GRAF Studio” software, please refer to the document in the http://www.icpdas.com/faq/isagraf.htm > FAQ-146.

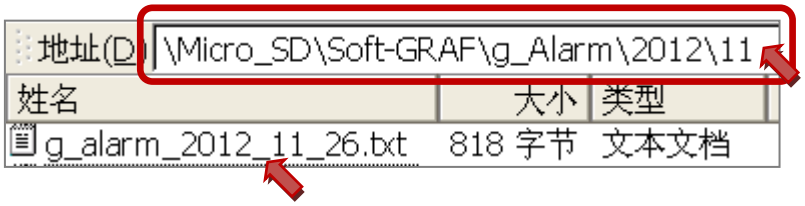
File format of the data file of the g_Alarm:

The data file of the“g_Alarm”can be one of the two formats. One is Excel file (.csv) and the other is Text file (.txt). The "g_Alarm" creates a new file name (.txt) in each day to save daily alarm messages. User can export data files to their USB pen drive or deliver them to a PC/FTP Server via FTP function. The file storage path is as the following.

A. For WP-8xx7 or VP-2xW7 or WP-5xx7:
   \Micro_SD\Soft-GRAF\g_Alarm\

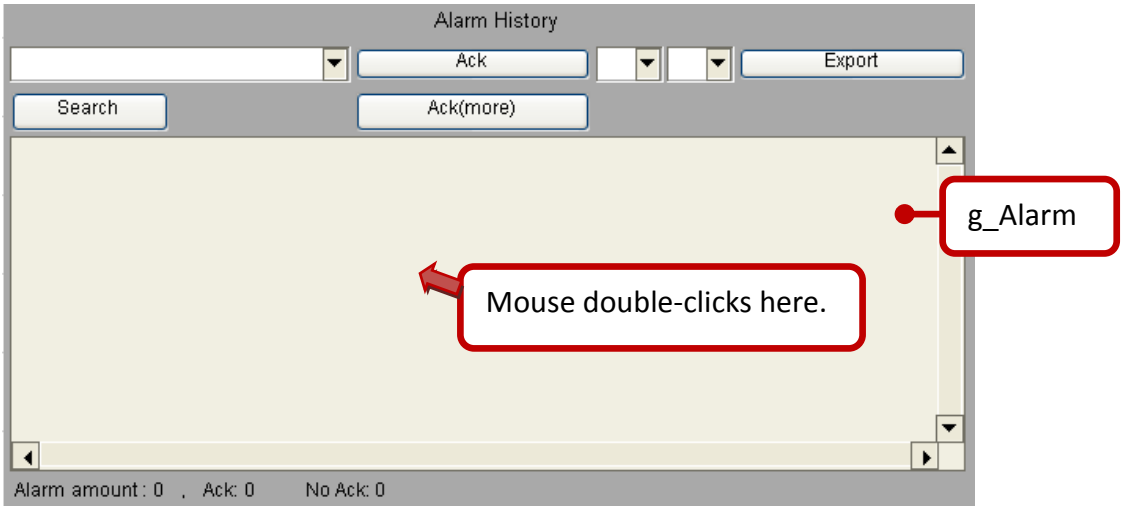
B. For XP-8xx7-CE6 or XP-8xx7-Atom-CE6:
   \System_Disk2\Soft-GRAF\g_Alarm\

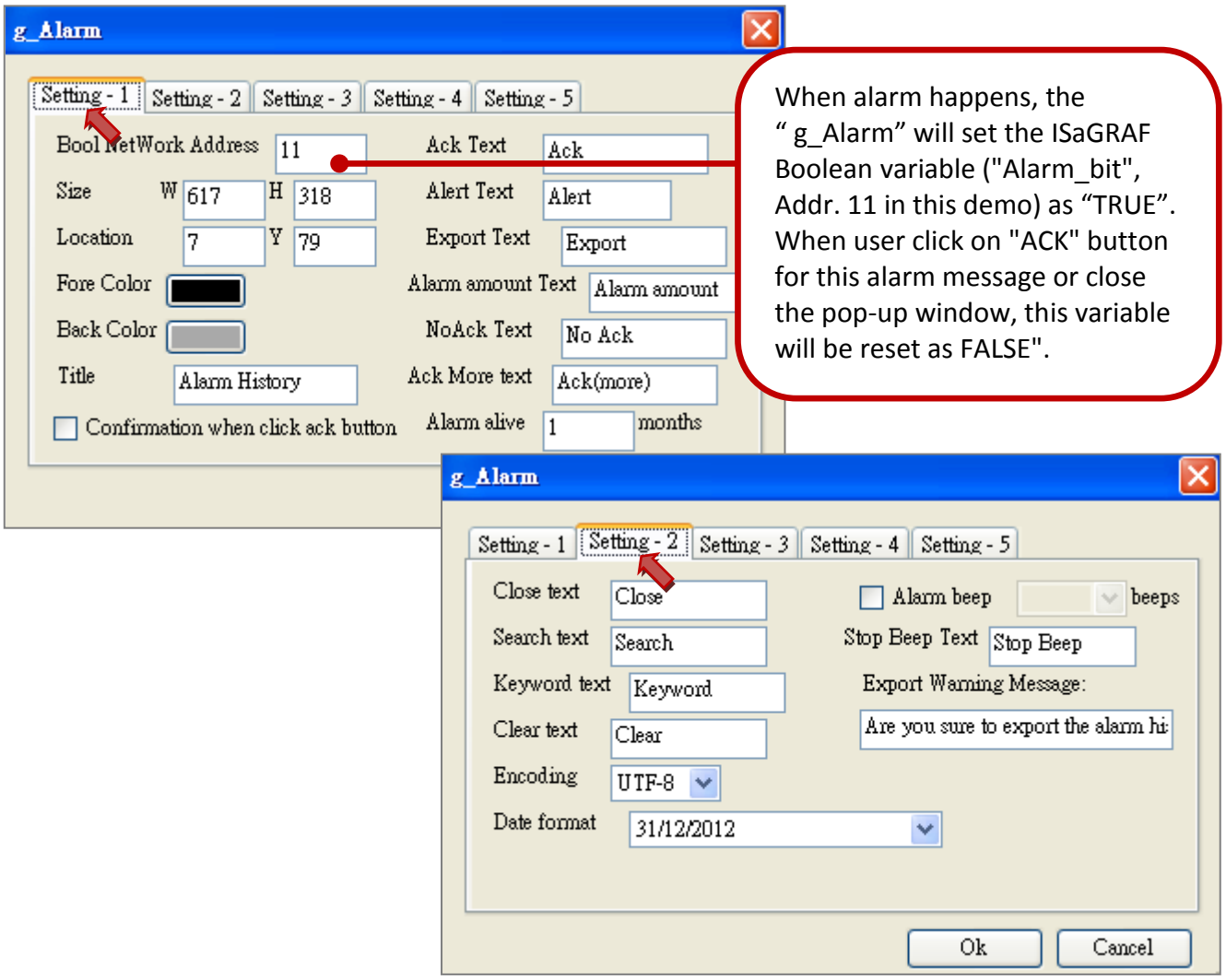
The system will create folders automatically depends on the date (year, month) to save the daily file. For example, the storage path of the VP-25W7 in this demo is shown as the following figure.



The setting for g_Alarm:

Mouse double-clicks the “g_Alarm” to open its configuration window:



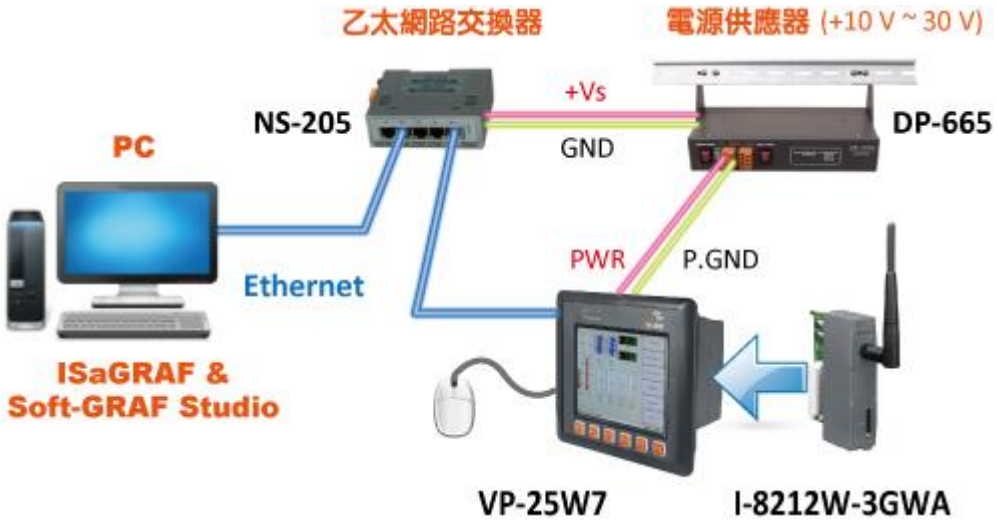


1.3. Testing Demo Programs

The section shows the way to test these three demo programs (FAQ160, FAQ160A and FAQ160B). First, download the ISaGRAF program and the related Soft-GRAF project to the ISaGRAF PAC. If the user is not familiar with the operations, please refer to FAQ-156, section 1.5.2 and 1.5.3 to download the program. Then, confirms the hardware configuration in the following figure.

1.3.1. Install the Hardware

As the figure, the testing environment is used for this demo. You may install devices according to your actual situation.



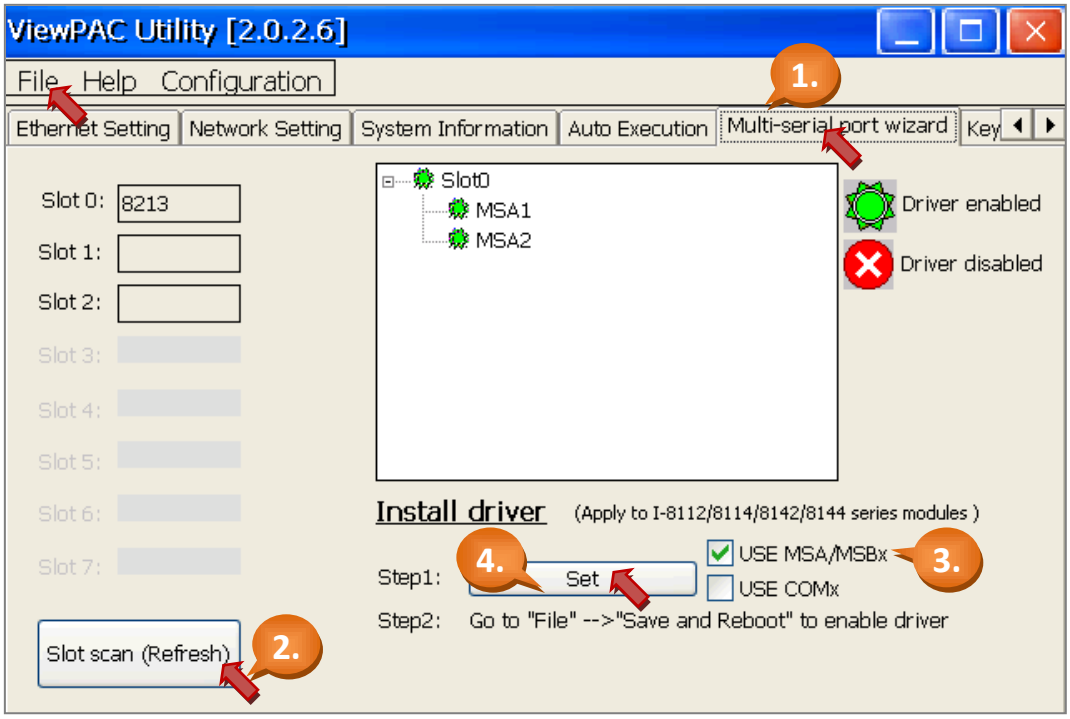
Note: The ISaGRAF demo programs "FAQ160A" and "FAQ160B" (except the "FAQ160") require user to install an optional I-8212W-3GWA (Industrial Tri-band 3G module) in the PAC with a registered SIM card from the Telecom company..

Here we plug one I-8212W-3GWA in the first slot (Slot0) of the VP-25W7 in this demo. To make the I-8212W-3GWA work in the PAC, follow below steps to setup it first.

1.3.2. Setup the I-8212W-3GWA Module in the PAC

1. Execute the “ViewPAC Utility” and click the “Multi-serial port wizard” tab.
2. Click the “Slot scan (Refresh)” button.
3. Check the “USE MSA/MSBx”. (Check only this option).
4. Click the “Set” button and then click “File > Save and Reboot” to complete the setting.

(As the following figure)



The new added COM Port is as the following table after setting up the I-8212W-3GWA successfully.

ISaGRAF PAC	I-8212W-3GWA	Added COM Port
VP-25W7/23W7	The 1st slot (Slot 0)	COM5
WP-8xx7		
XP-8xx7-CE6	The 1st slot (Slot 1)	COM6
XP-8xx7-Atom-CE6		

Please use the “GTM-201-RS232” if your PAC is WP-5147 (There is no IO slot to plug the I-8212W-3GWA in it).

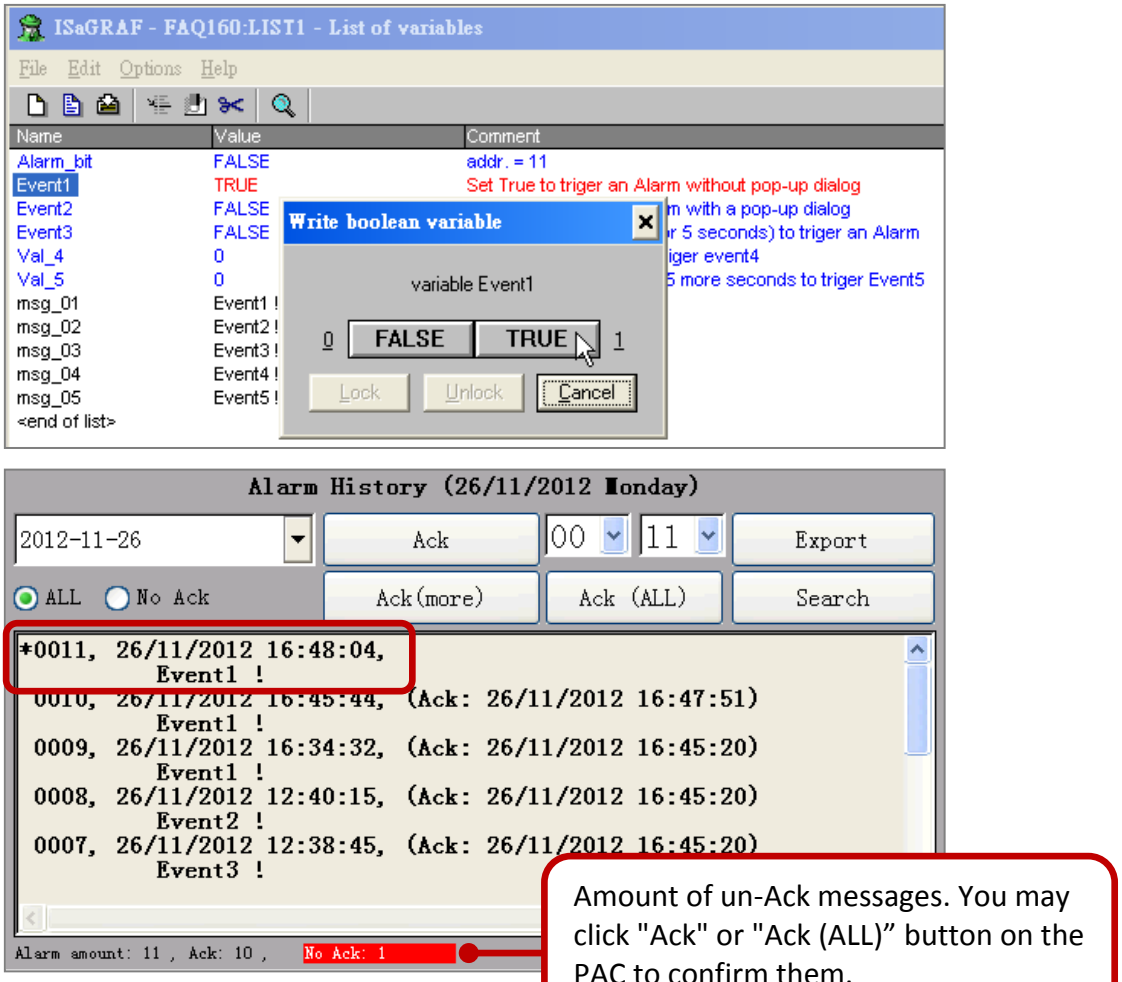
ISaGRAF PAC	GTM-201-RS232	COM Port Number
WP-5147	RS-232 Port	COM3

If the setting is correct and the 2G/3G signal is well, the “sms” status in the ISaGRAF - “I/O Connection” window should be “TRUE”.

1.3.3. Testing the Demo – FAQ160

Please make sure you have downloaded the ISaGRAF demo (FAQ160) and Soft-GRAF demo (FAQ160.sof) to the PAC. After downloading, you can modify the variable status or value in the ISaGRAF variables list on PC and then to see the change of the Soft-GRAF HMI in the PAC.

For example, the Soft-GRAF HMI will show alarm message “Event1 !” when setting the "Event1" value from "FALSE" to "TRUE" .



You can try more:

Variables	Description of Operation
Event1	Set to True, it will show an alarm message "Event1 !”.
Event2	Set to True, it will show an alarm message "Event2 !” and pop-up the alert dialog.
Event3	Set to True and holds at TRUE for five more seconds, it will show an alarm message "Event3 !” and pop-up the alert dialog.
Val_4	Set larger than "1000”, it will show an alarm message "Event4 !” and pop-up the alert dialog.
Val_5	Set larger than "1000”and holds on it for five more seconds, it will show an alarm message "Event5 !” and pop-up the alert dialog.

1.3.4. Testing the Demo – FAQ160A

Please make sure the ISaGRAF demo (FAQ160**A**) and Soft-GRAF demo (FAQ160**A**.sof) have been downloaded to the PAC. This section will explain how to send a short message to one cellular phone. First, please click “Change receiver number” button in the Soft-GRAF HMI to set the phone number.

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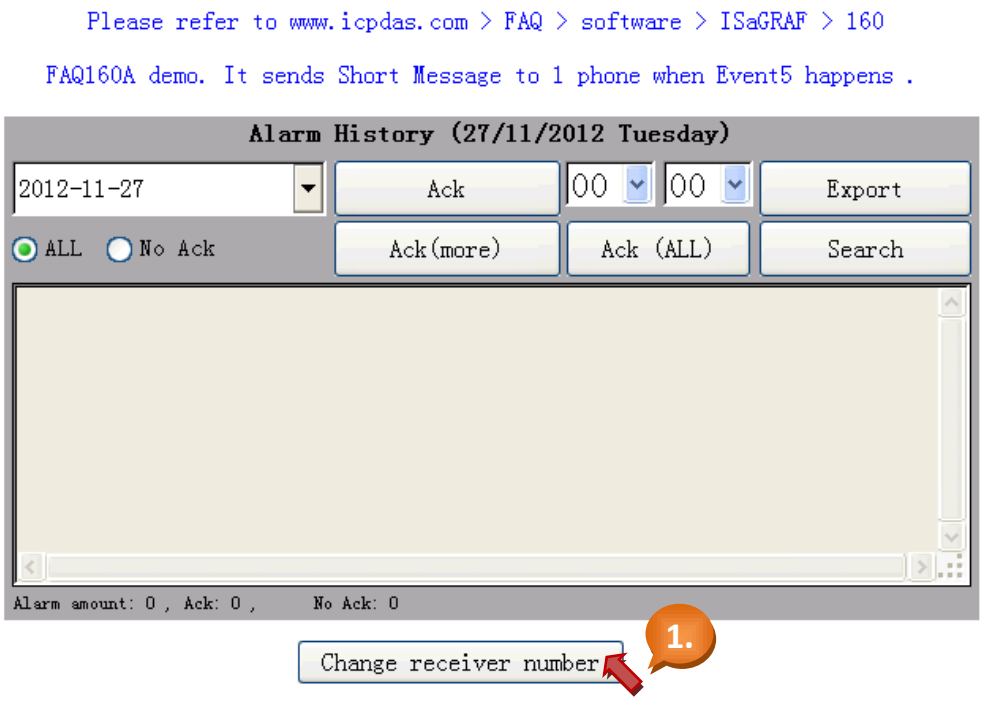
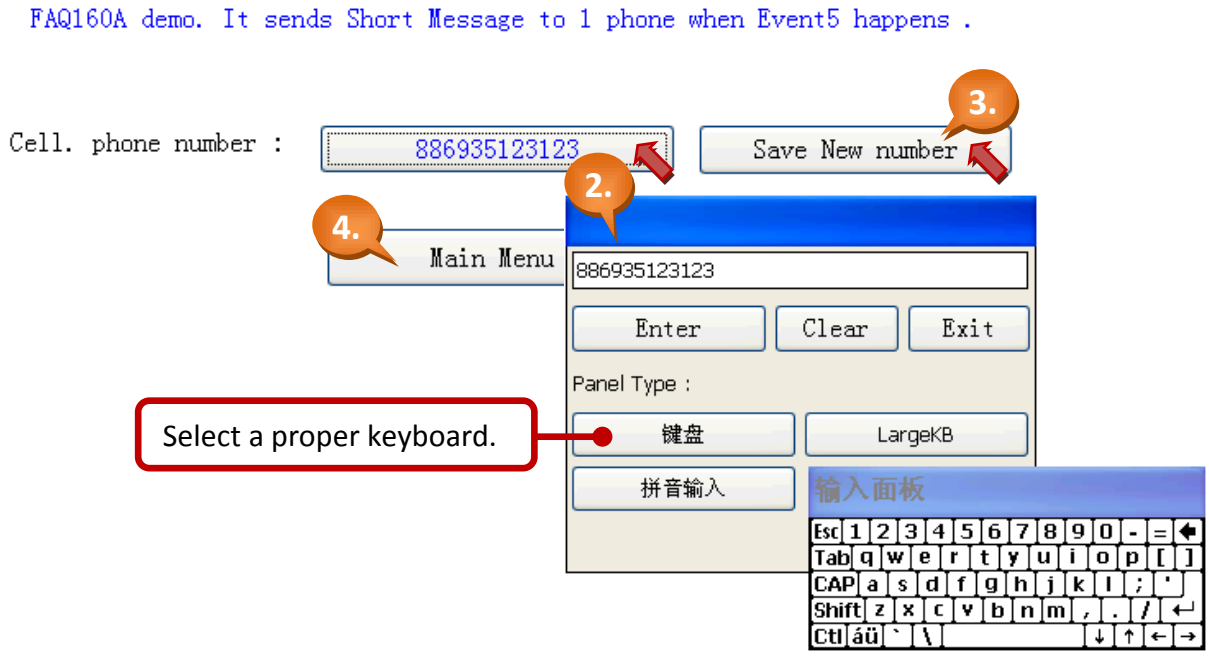
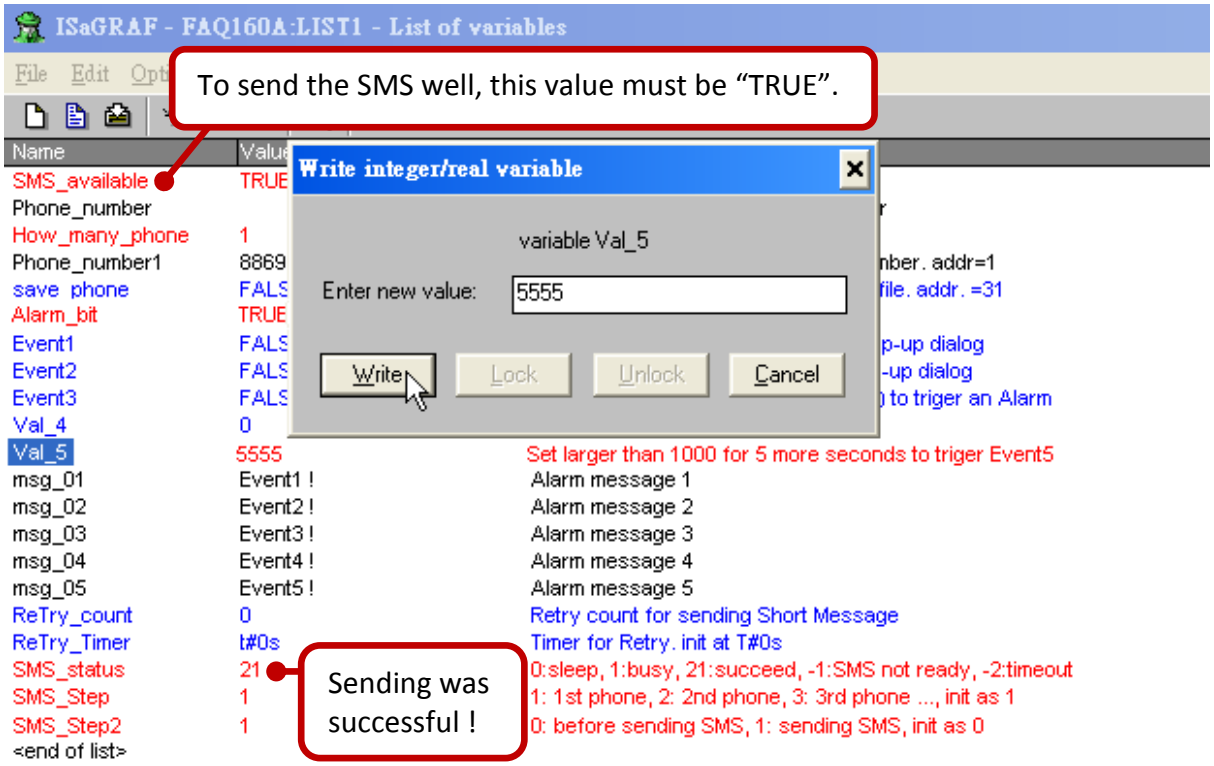


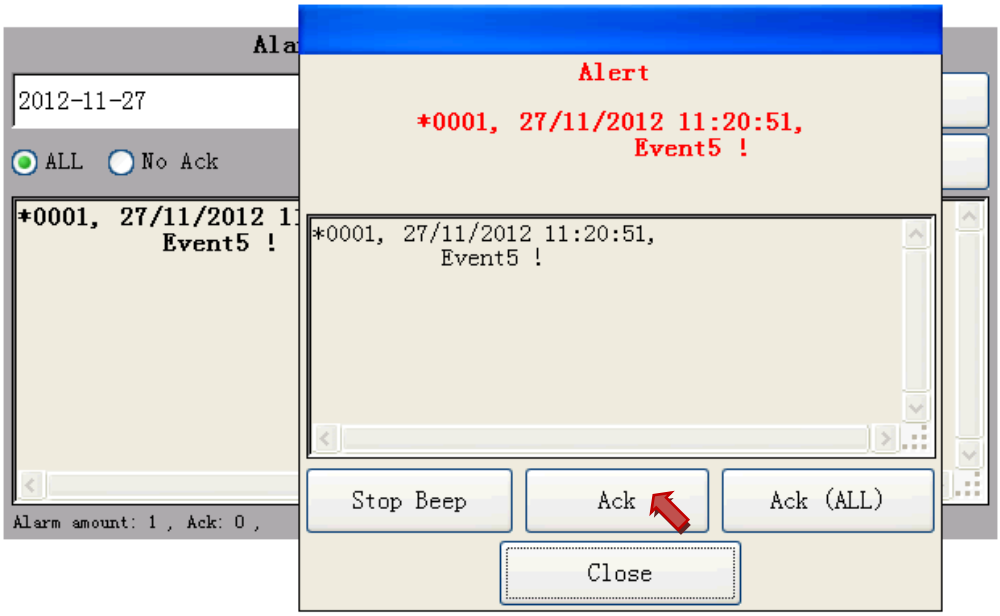
The phone number varies in different countries or regions, here we use Taiwan’s cellular phone number as an example. For instance, if the phone number is “0935-123-123”, fills out “**886**935123123” and then clicks “Save New number” to save the settings then click “Main Menu” to return the main page.



In the “FAQ160A” demo, when the “Event5” is triggered, it will send a short message to one cellular phone. So, please set the “Val_5” larger than “1000” (e.g. “5555”) in the ISaGRAF variables list, then the cellular phone will receive the alarm message “Event5 happens !” after five seconds. If user set the “Val_5” larger than “1000” and then change the value to less than “1000” within five seconds, the “Event5” will not be triggered.

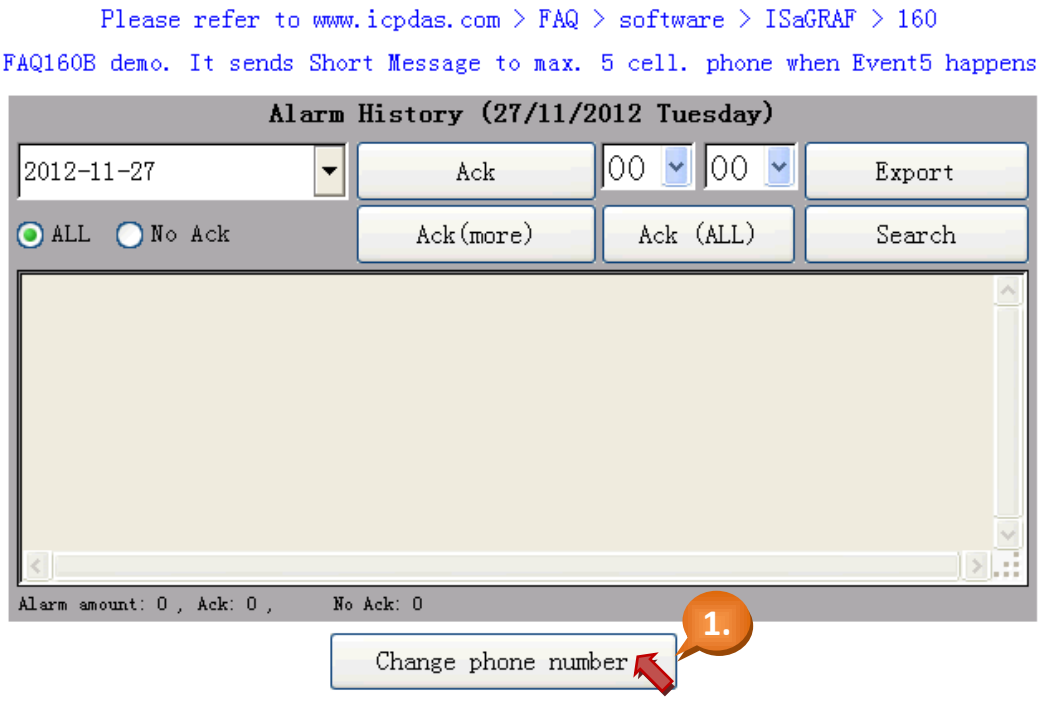


Now, you will see the pop-up window in the Soft-GRAF HMI. Try to click the “Ack” button to confirm this alarm message and then click “Close” to close the pop-up window.

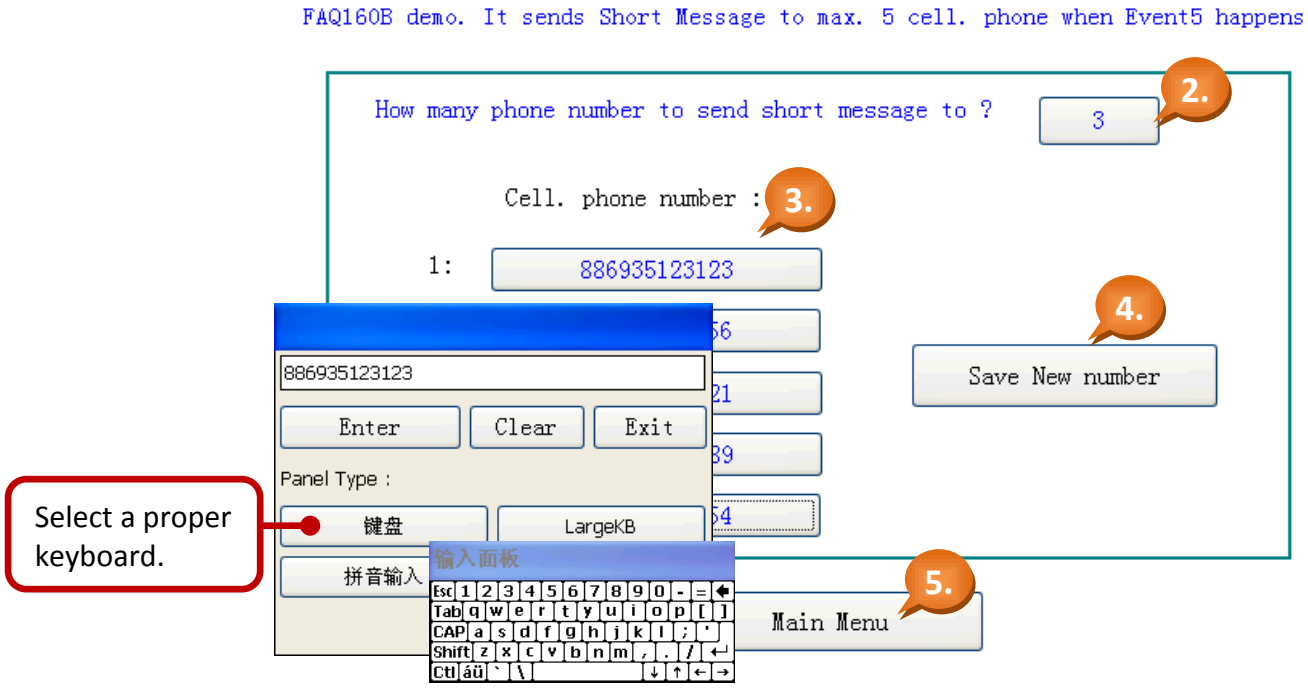


1.3.5. Testing the Demo – FAQ160B

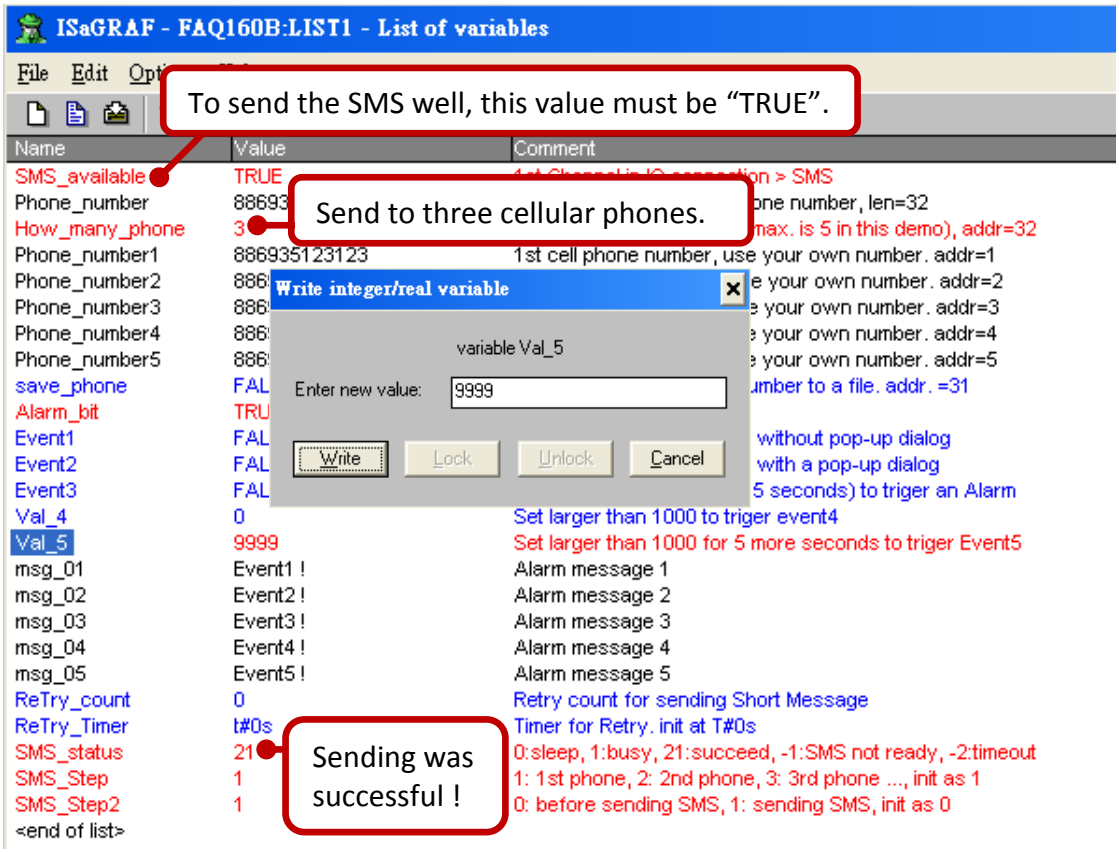
Please make sure the ISaGRAF demo (FAQ160**B**) and Soft-GRAF demo (FAQ160**B**.sof) have been downloaded to the PAC. This section will explain how to send a short message to max. 5 cellular phones. First, please click “Change phone number” button in the Soft-GRAF HMI to enter its configuration page.



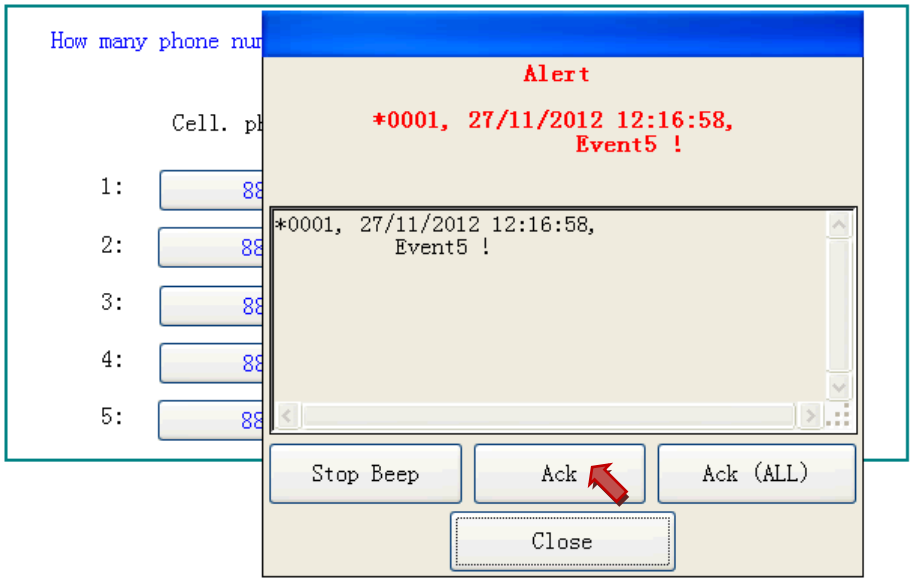
Then, fill out the amount of cellular phones (e.g. 3) and then fill out the phone number by order (here, we use Taiwan’s phone number as an example, e.g. **886**935123123), then click “Save New number” to save the settings and click “Main Menu” to return the main page.



In the “FAQ160B” demo, when the “Event5” is triggered, it will send a short message to three cellular phones. So, please set the “Val_5” larger than “1000” (e.g. “9999”) in the ISaGRAF variables list, then the cellular phone will receive the alarm message “Event5 happens !” after five seconds. If user set the “Val_5” larger than “1000” and then change the value to less than “1000” within five seconds, the “Event5” will not be triggered.

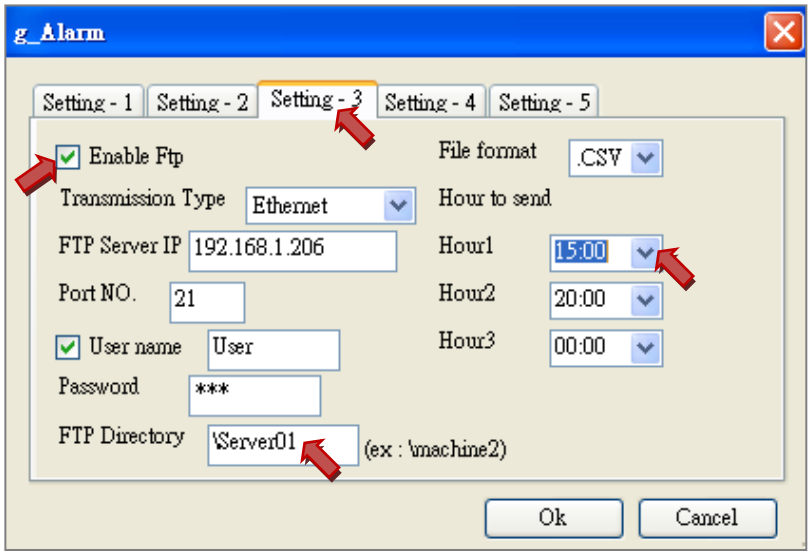


Now, you will see the pop-up window in the Soft-GRAF HMI. Try to click the “Ack” button to confirm this alarm message and then click “Close” to close the pop-up window.



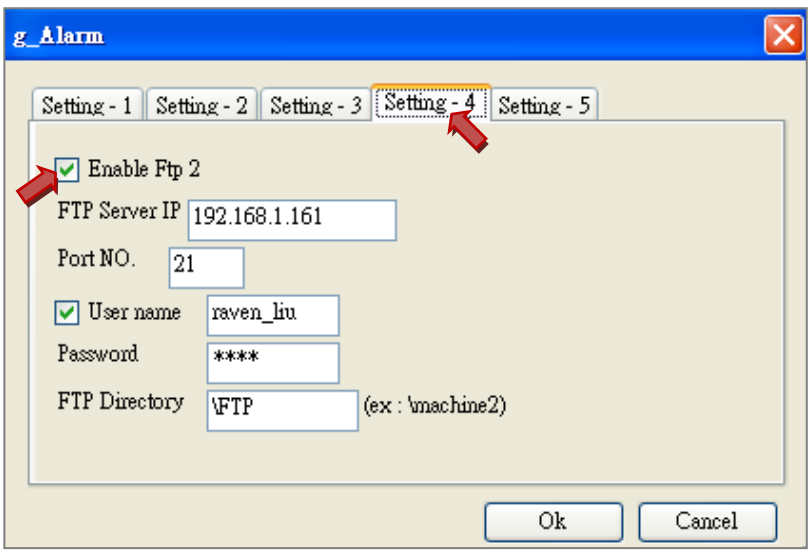
1.4. Enable the FTP Client to Send Data File of the g_Alarm to the FTP Server

For sending the daily data file to another PC (enabled FTP Server) by enabling the FTP Client function of g_Alarm, please do the following setting. Be aware of the setting of "FTP Directory", use the "****" symbol, DONOT use the "/" symbol. For example, the "**\Server01**" and "****" are correct. However "/ Server01" and "/" are incorrect.



Moreover, users can check the "Enable Ftp 2" (in the tab "Setting - 4") and set the related parameters to send data file to the second FTP Server.

Note: The "Enable Ftp2" doesn't work if the first "Enable Ftp" (in the tab "Setting - 3") is not checked.

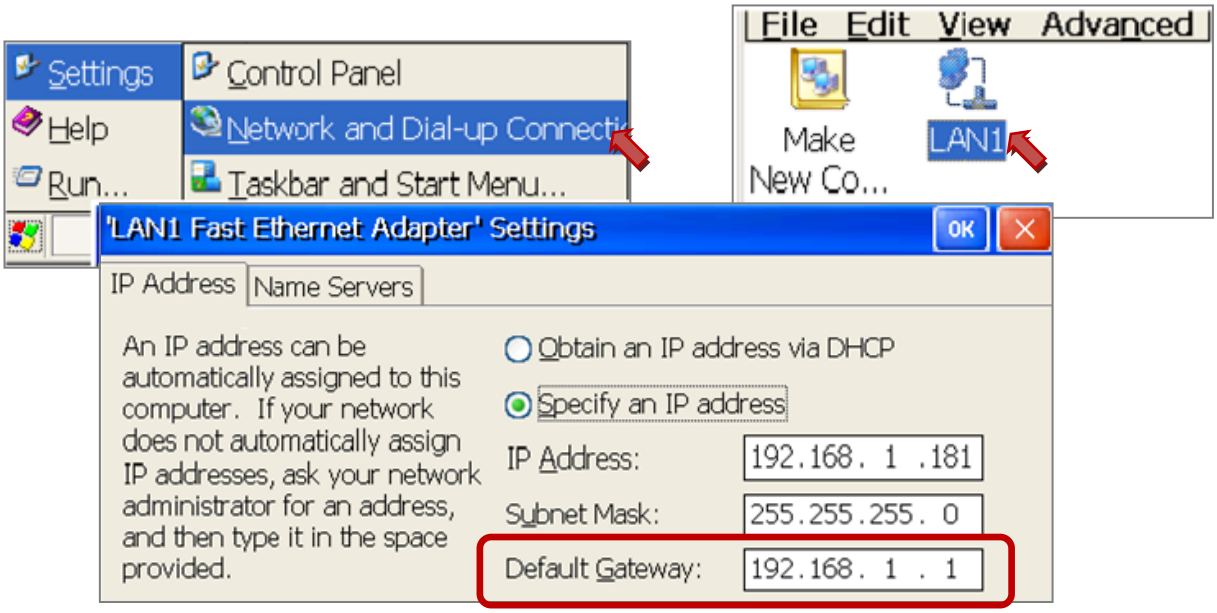


Note:

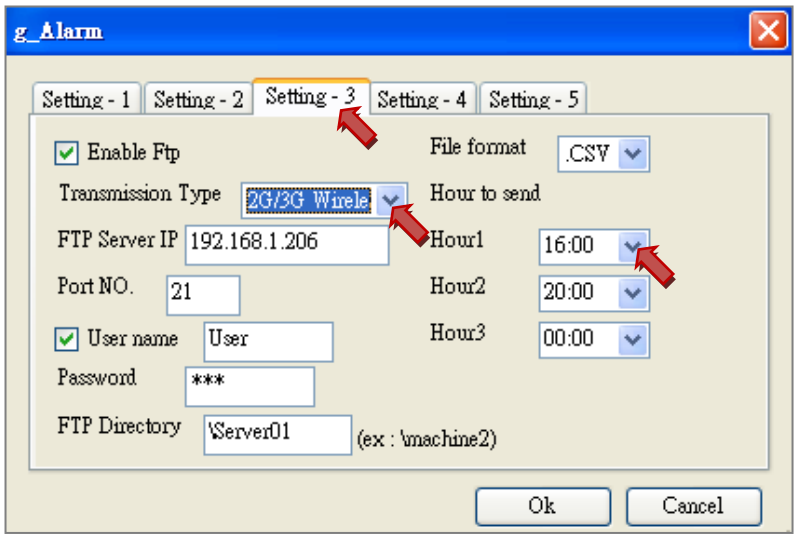
1. When set the g_Alarm - Hour1 ~ 3, it will send files to the FTP Server at about three minutes past the hour, not on the hour. For example, set the "Hour1" as "08:00", it starts to send files at "08:03".

2. The FTP Client function of g_Alarm has a re-try mechanism. When the file is unable to be successfully passed to the FTP Server, it will re-try to send every 4 hours until it succeeds or expire 7-days.

3. The “FTP Server IP” means the IP address of the PC which will receive the data file. If the PC is not in the same IP domain as the PAC, set a proper “Default Gateway” setting for the LAN port of the PAC. (You may find the Gateway-IP-address by key-in the “ipconfig” command on the PC which is connected in the same IP domain of the PAC).

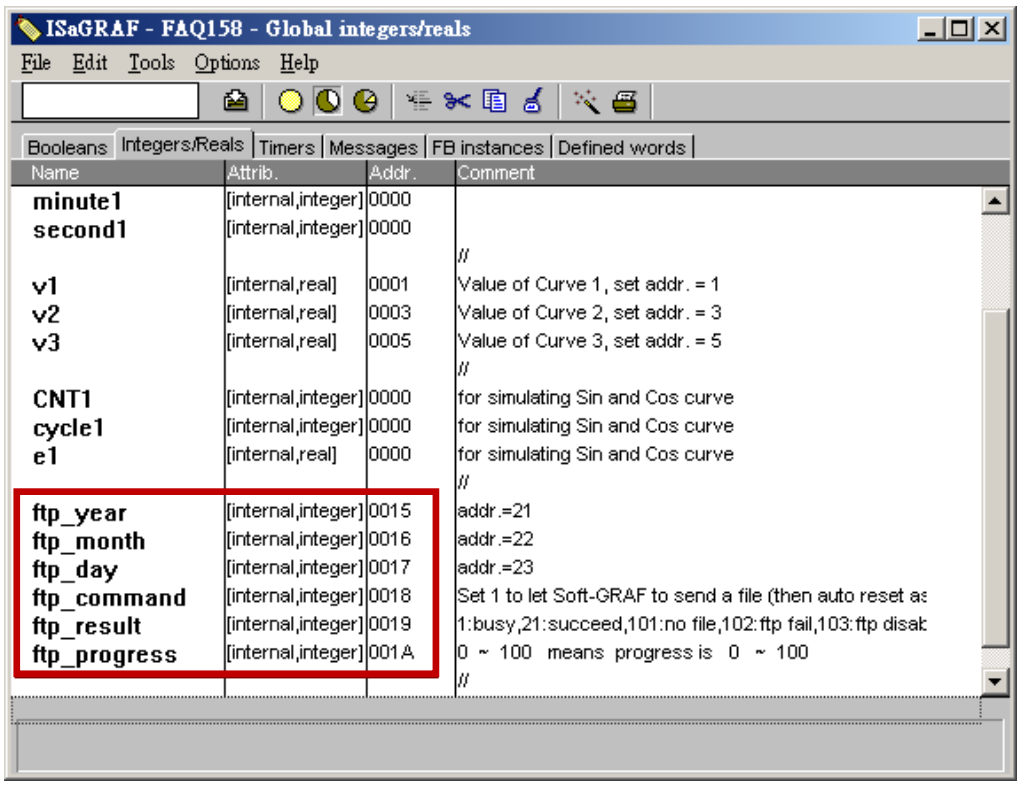


To send data file to a remote PC/FTP Server by 2G/3G dial-up wireless connection, set the “Transmission Type” as “2G/3G Wireless”. And this PAC requires a 2G/3G I/O module and a SIM card. (For example, the I-8212W-3GWA : http://m2m.icpdas.com/i-8212w-3GWA.html). Then follow steps listed in the section 1.1 and section 1.2 of the web site http://www.icpdas.com/faq/isagraf.htm > FAQ-143 to setup the 2G/3G I/O module. .



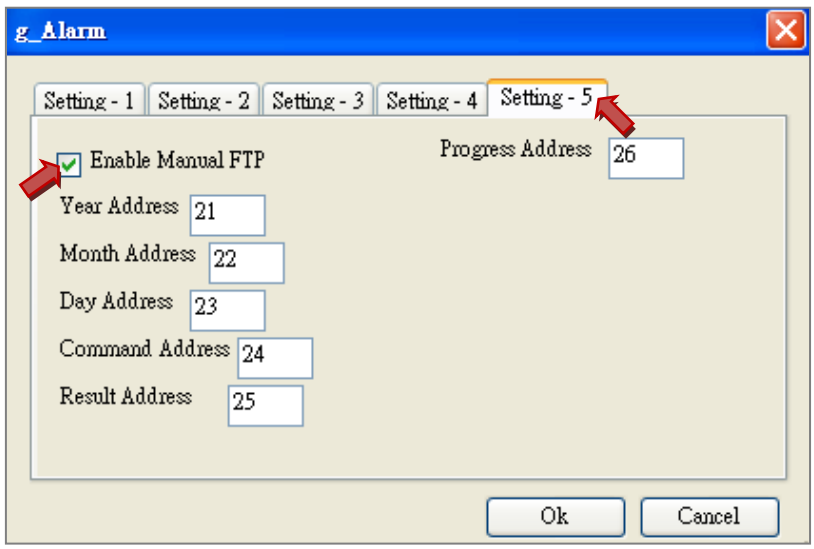
1.5. Using the "FTP_Loader" to Upload the Data File of a Specified Date

The "faq160_demo_chinese.zip" includes a utility "FTP_Loader.exe". It can run in a PC/Windows. Its purpose is to command the g_Alarm to send the data file of a specified date to the PC/FTP Server. To use this function, first add six integer variables with six continuous network-address numbers in the ISaGRAF program similar as the following figure (It shows their network number are from 21 to 26, Hex. is 15, 16, ... to 1A).

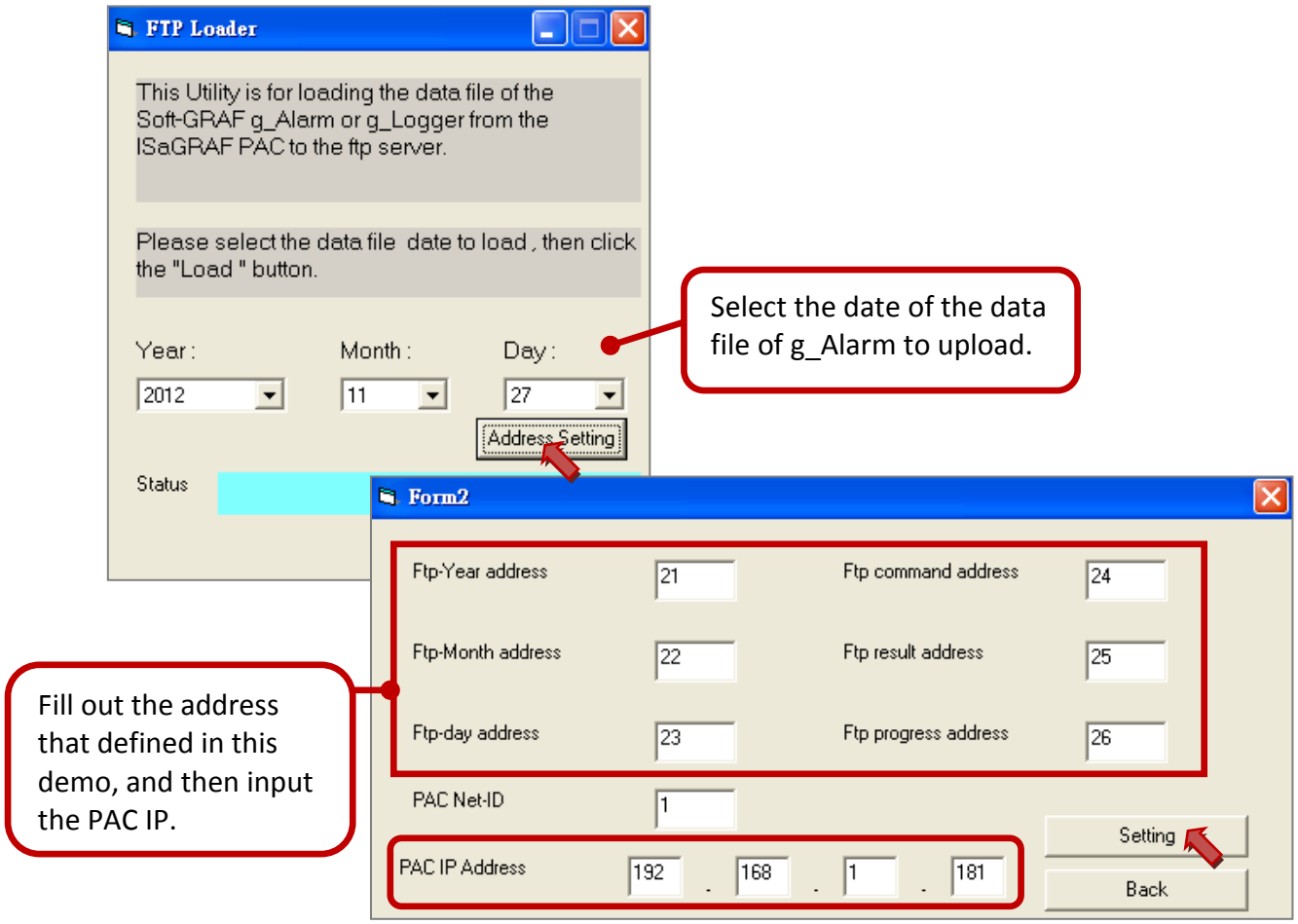


Then do the following settings in the "g_Alarm".

Note: This function doesn't work if the "Enable Ftp" option (in the tab "Setting - 3) is unchecked.



Then, run the "FTP_Loader.exe" in a PC to do the "Address Setting".



After completing the setting, please click "Load" button to upload the data file of the specified date (e.g. 2012/11/27) to the PC/Server. If the file uploaded successfully, it will show as the below figure.