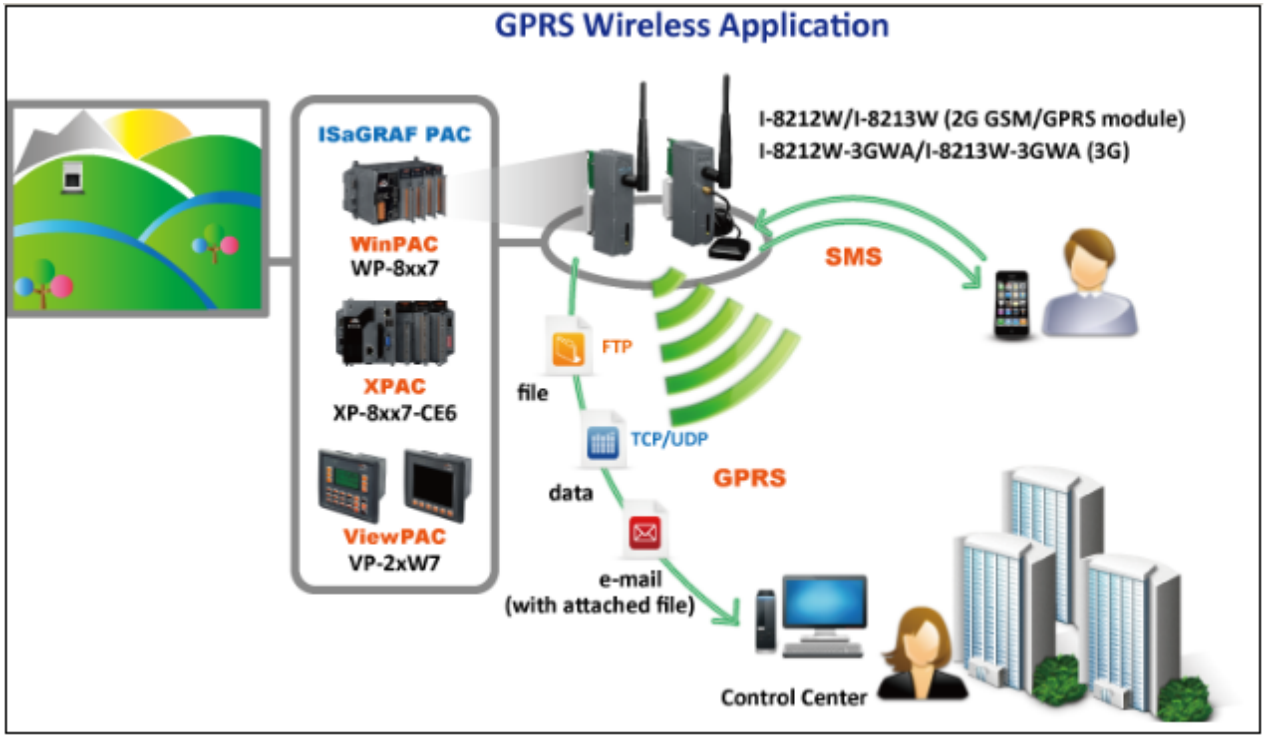
How to Make “ISaGRAF WinCE PAC” to Connect to the Internet and Send Data by 2G / 3G wireless Dial-up ? How to get the location by using GPS ?

Sending back the collected data to the control center is necessary in some application. However, there may be no cable can reach the field or the cost of the network wiring is too expensive. ICP DAS released the “ISaGRAF PAC + I-8212W (or I-8213W)” solution for such applications (Or WP-5147 + GTM-201-RS232 or GTM-201-3GWA).

Designers can collect I/O data or other application data by program a PLC application (Ladder, ST, Function block, ...) with ISaGRAF software. Using the device – “I-8212W” or “I-8213W” (insert the SIM card inside that has registered the GPRS service from the Telecom Company) to connect internet by dial-up GPRS, then the PLC can send e-mail or TCP/UDP data to the center.



The following ISaGRAF driver version supports the dial-up GPRS (2G) access with I-8212W .

XP-8xx7-CE6: 1.17 or later ; **WP-8xx7**: 1.37 or later ; **VP-25W7/23W7**: 1.29 or later

The following ISaGRAF driver version supports the dial-up (3G) access with the I-8212-3GWA (or I-8213W-3GWA).

XP-8xx7-CE6: 1.24 or later ; **WP-8xx7**: 1.44 or later ; **VP-25W7/23W7**: 1.36 or later

If the PAC is **WP-5xx7** (ISaGRAF driver version 1.01 or later), its COM3 (RS-232) can link one GTM-201-RS232 (2G) or GTM-201-3GWA (3G) to dial up .

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If the ISaGRAF driver version of your PAC is older than the above listed version, please visit the http://www.icpdas.com/en/download/show.php?num=368&nation=US&kind1=&model=&kw=isagraf to download the newer driver.

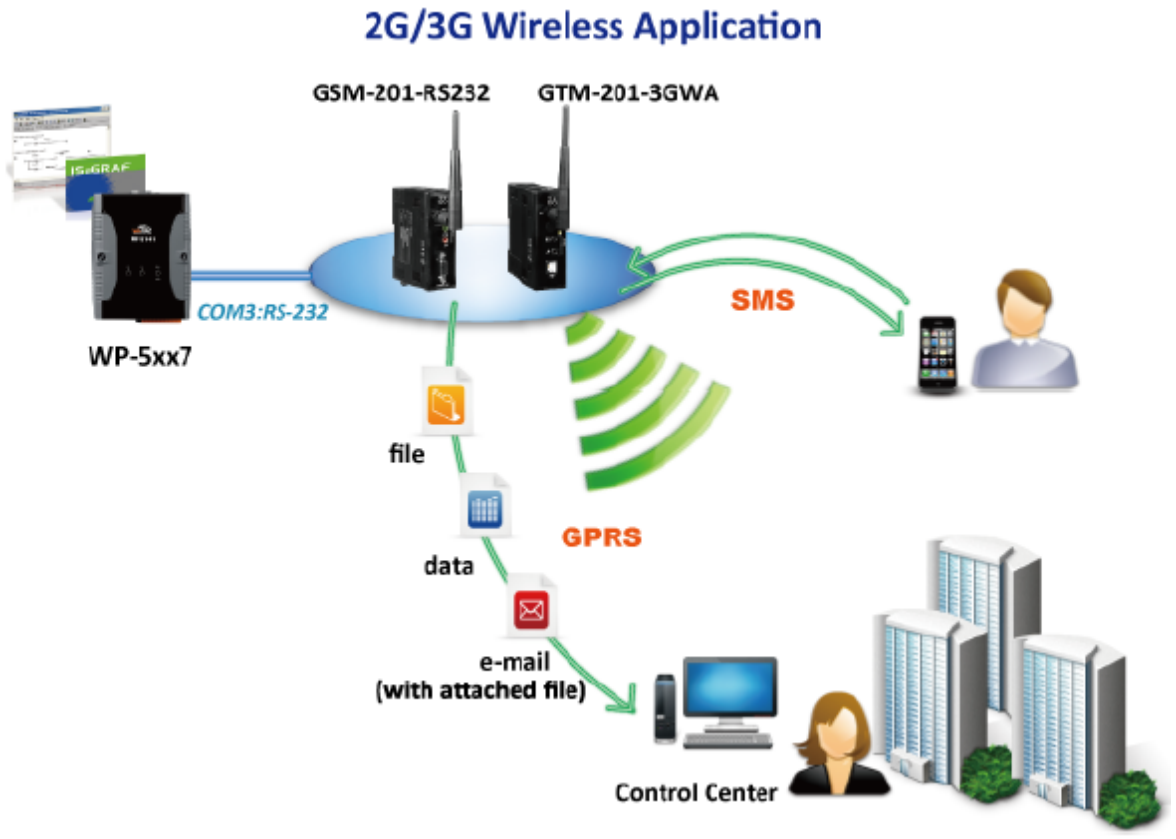
This paper is the ISaGRAF FAQ-143. Users can download the document and demo programs from https://www.icpdas.com/en/faq/index.php?kind=280#751 **> 143**.

I-8212W , I-8212W-3GW , I-8213W-3GWA :
http://www.icpdas.com/en/product/guide+Wireless__Communication+3G_4G__Products+Modem#596

GTM-201-RS232 (2G) 與 GTM-201-3GWA (3G) :
http://www.icpdas.com/en/product/guide+Wireless__Communication+3G_4G__Products+Modem#596

Note: Please refer to the section 1.5 for the GPS function in the I-8213W and I-8213W-3GWA.

Note: Please refer to the https://www.icpdas.com/en/faq/index.php?kind=280#751 **> FAQ-151** for the application to deliver files to a remote ftp-server in a PC on the Internet.



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1.1 : Hardware Installation

The I-8212W supports 2G GPRS/GSM. Insert the GPRS SIM card (that registered the GPRS function from the Telecom Company) into the “SIM card” socket of the I-8212W card and make sure the antenna has installed well. (However plug-in a 3G SIM card for the I-8212W-3GW and I-8213W-3GWA)

If your PAC is XP-8xx7-CE6 or XP-8xx6-CE6, plug the I-821xW in its slot 1 (leftmost I/O slot).

If your PAC is WP-8xx7 or WP-8xx6 or VP-25W7/VP-25W6 or VP-23W7/VP-23W6, please plug the I-821xW in its slot 0.

If your PAC is WP-5147, link its COM3 : RS-232 to a GTM-201-RS232 (2G) or GTM-201-3GWA (3G) and set the GTM-201 's SW1 to the “None” position.

Then power on the PAC and run PAC Utility (for example, run WinPAC utility for WinPAC) to setup the “MSA1” port of the I-821xW. Remember to run “File > Save and Reboot” once to save the settings.

If the PAC is XP-8xx7-CE6 / XP-8xx6-CE6, this step is not necessary (MSA1 is already in the XP-8000-CE6).

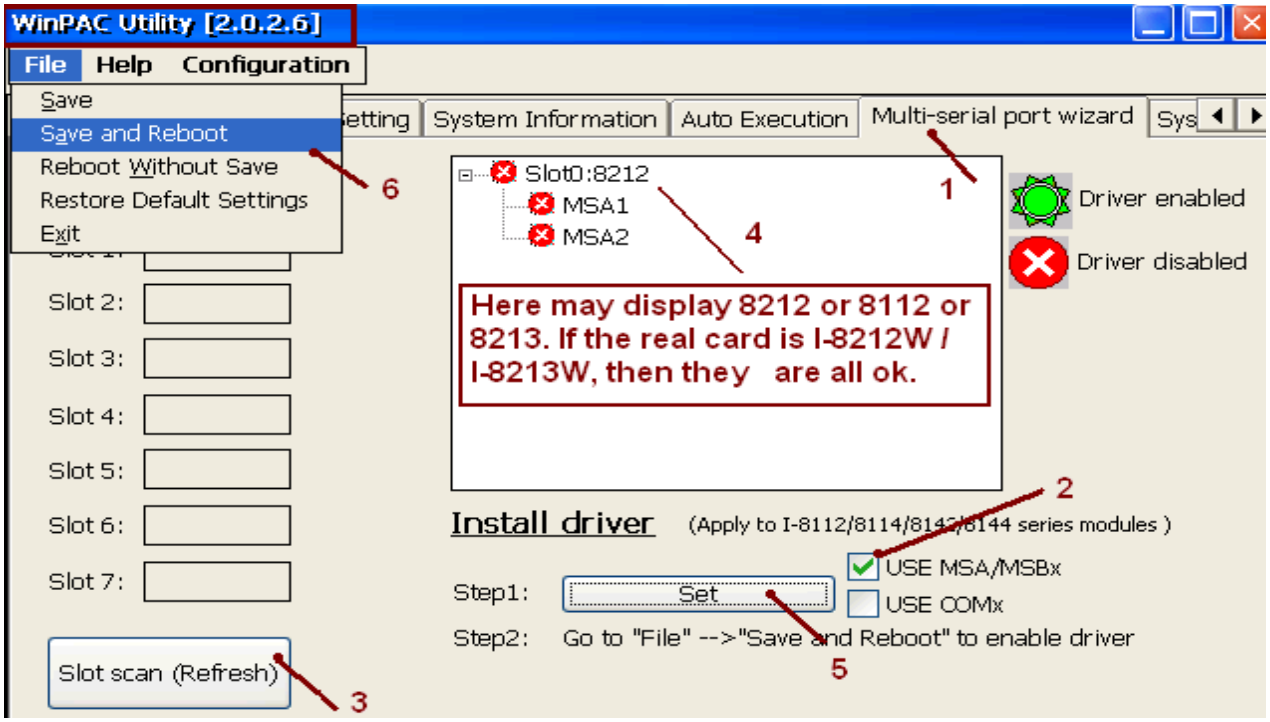
If the PAC is WP-5147, this step is not necessary (because it is using COM3 not MSA1)

However it is necessary for WinPAC and ViewPAC. Make sure your PAC utility is the version **2.0.2.6** or later version before setup the“MSA1”port. If yours is older version, please visit the below web site to download the utility and update it to the“\System_Disk\Tools\WinPAC_Utility”directory for WinPAC (ViewPAC is “\System_Disk\Tools\ViewPAC_Utility”).

WP-8xxx:
http://www.icpdas.com/en/download/show.php?num=2489&nation=US&kind1=&model=&kw=wince5

ViewPAC :
http://www.icpdas.com/en/download/show.php?num=2489&nation=US&kind1=&model=&kw=wince5

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1.2 : Software Installation

Please check the ISaGRAF driver version for your PAC is the correct version that listed in the first page of this document. If not, update it.

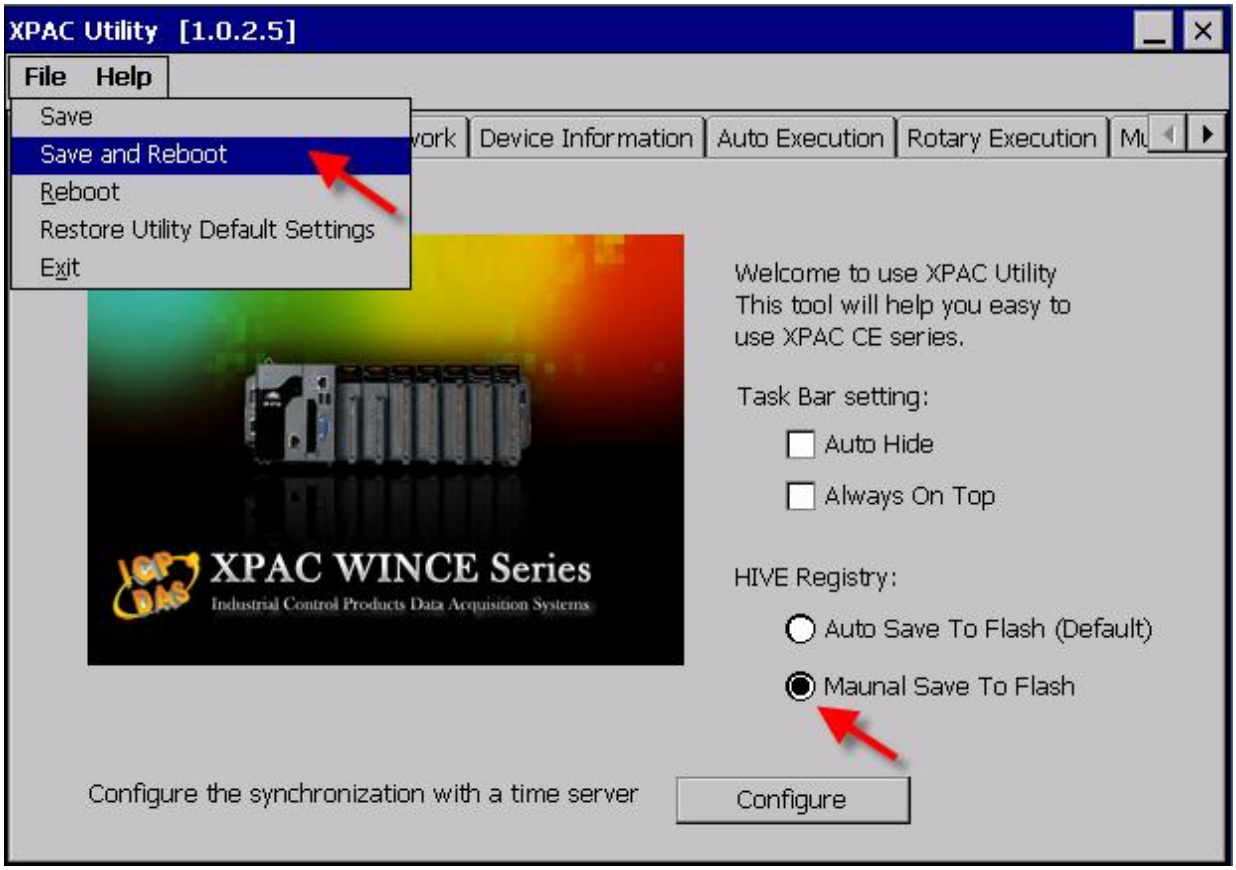
Note: Please refer to the https://www.icpdas.com/en/faq/index.php?kind=280#751 **> FAQ-151** for the application to deliver files to a remote ftp-server in a PC on the Internet.

1.2.1 : Install the I-8212W / I-8213W or GTM-201 Driver

Double-click the “icpdas_i-821xw_MSA1_v1.00.cab” file in the path of ISaGRAF PAC: \System_Disk\ISaGRAF\ to install the I-8212W / I-8213W driver if the PAC is WP-8xx7, VP-25W7 or XP-8xx7-CE6.

Double-click the “ICPDAS GTM-201-RS232_COM3_winpac_v1.01.cab” in the path of PAC : \Micro_SD\ISaGRAF\ to install the GTM-201-Rs232 (2G) or GTM-201-3GWA (3G) driver if the PAC is WP-5xx7.

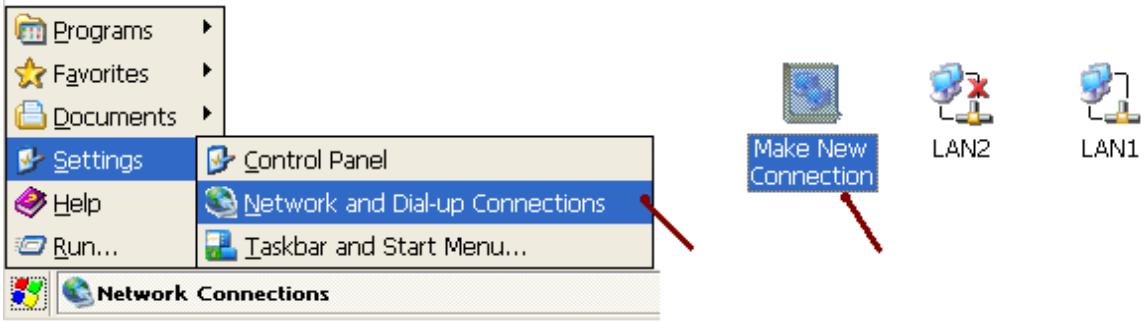
After completing the installation, remember to open the WinPAC Utility (or ViewPAC Utility, XPAC Utility) and run “File > Save and Reboot” to save the settings, then the PAC will restart automatically once. In the below figure, we use XP-8000-CE6 as a sample (XP-8xx7-CE6/ XP-8xx6-CE6, please select “Manual Save To Flash” and then run “File > Save and Reboot”).



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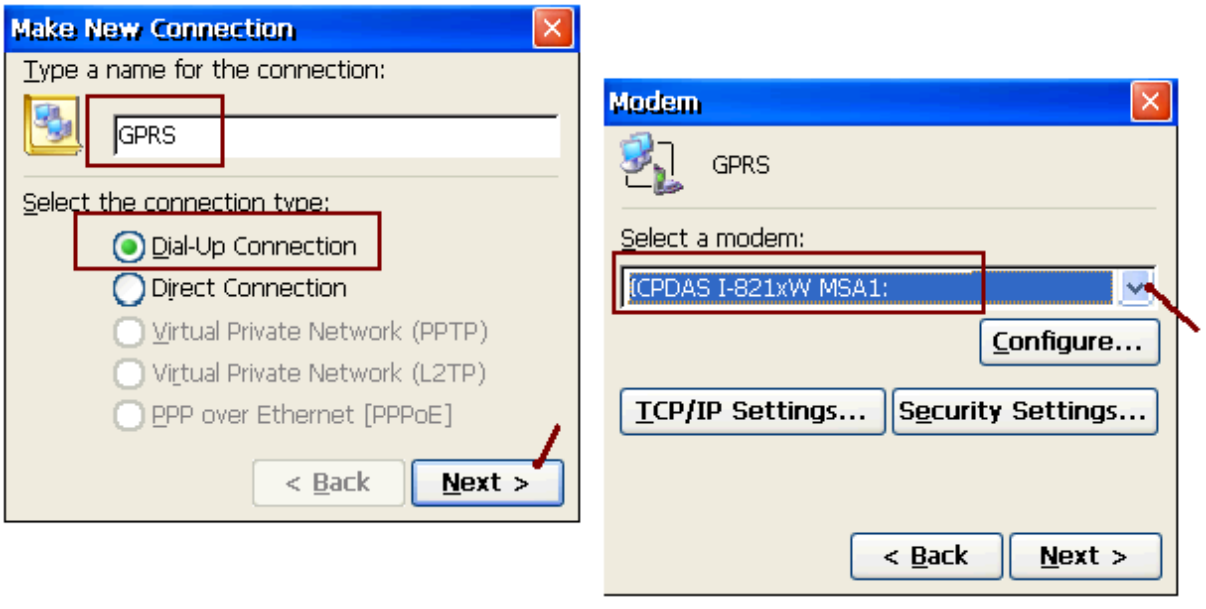
1.2.2 : Configure the GPRS Dial-up Parameters

At first, get into the “Network and Dial-up Connections” and then run “Make New Connection” in the PAC.



Select “Dial-Up Connection” and type an English name (ex. GPRS, it allows to contain the numbers 0 to 9) then click “Next” and select the modem - “ICPDAS I-821xW MSA1:” .

(If the PAC is WP-5147, select the “ICPDAS GTM-201-RS232 COM3:”)



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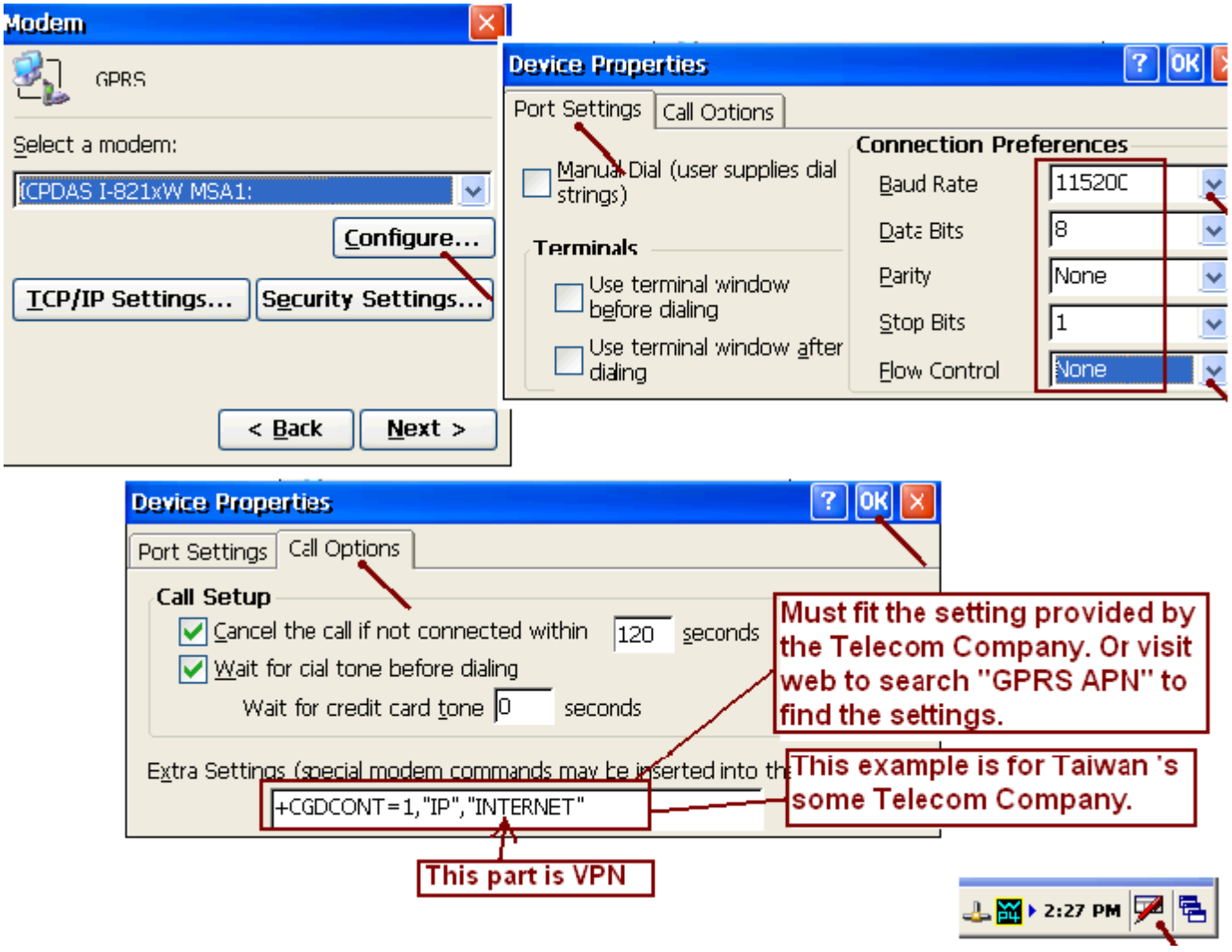
Then click the “Configure ...” button. In the “Port Settings” tab, select “Baud Rate” as “115200”, “Data Bits” as “8”, “Parity” as “None”, “Stop Bits” as “1” and “Flow Control” as “None”, and then click “Call Options” tab to set up the “Extra Settings” (the settings depends on each of the Telecom Company). For example, the settings provided by a Telecom Company in Taiwan is

+CGDCONT=1,”IP”,”INTERNET”

and a Telecom Company in China is

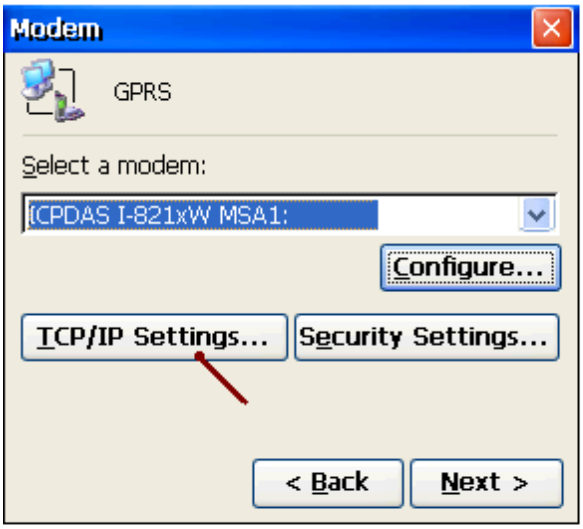
+CGDCONT=1,”IP”,”CMNET”

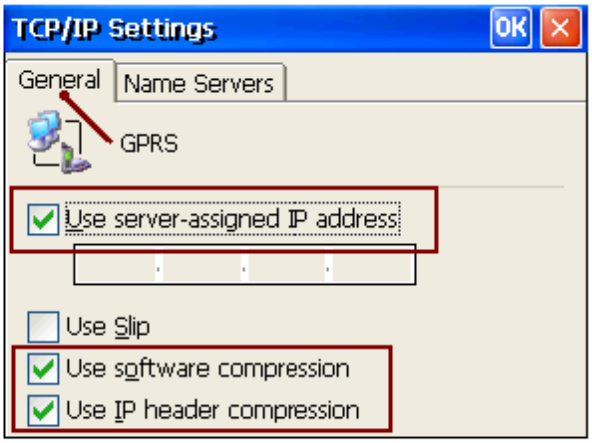
This configuration includes the “GPRS APN”, please contact your SIM card provider (Telecom Company), to get the settings, or you can also visit the web to search the word “GPRS APN” to find the settings.

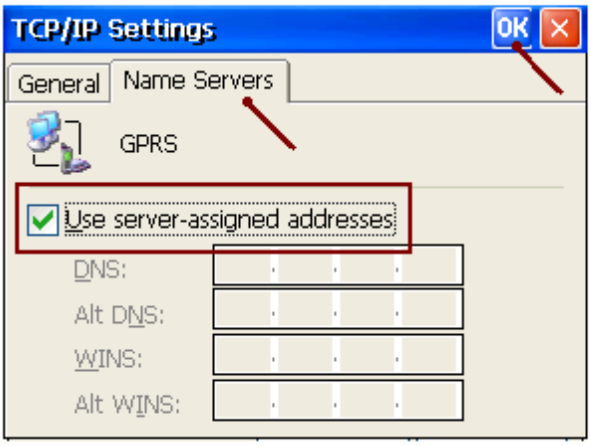


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Then get into the “TCP/IP Settings ...” dialog box and follow the same settings as below.

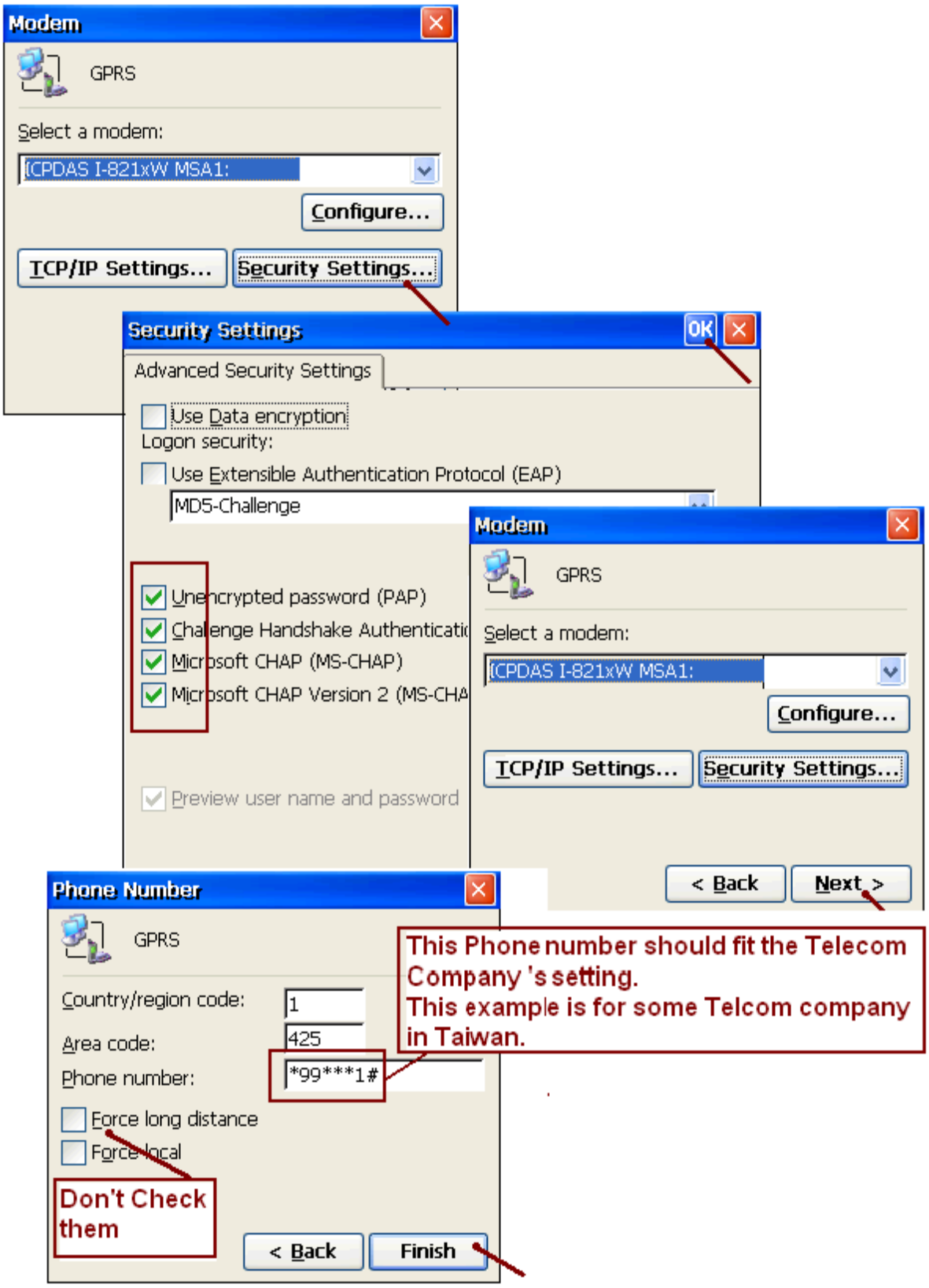






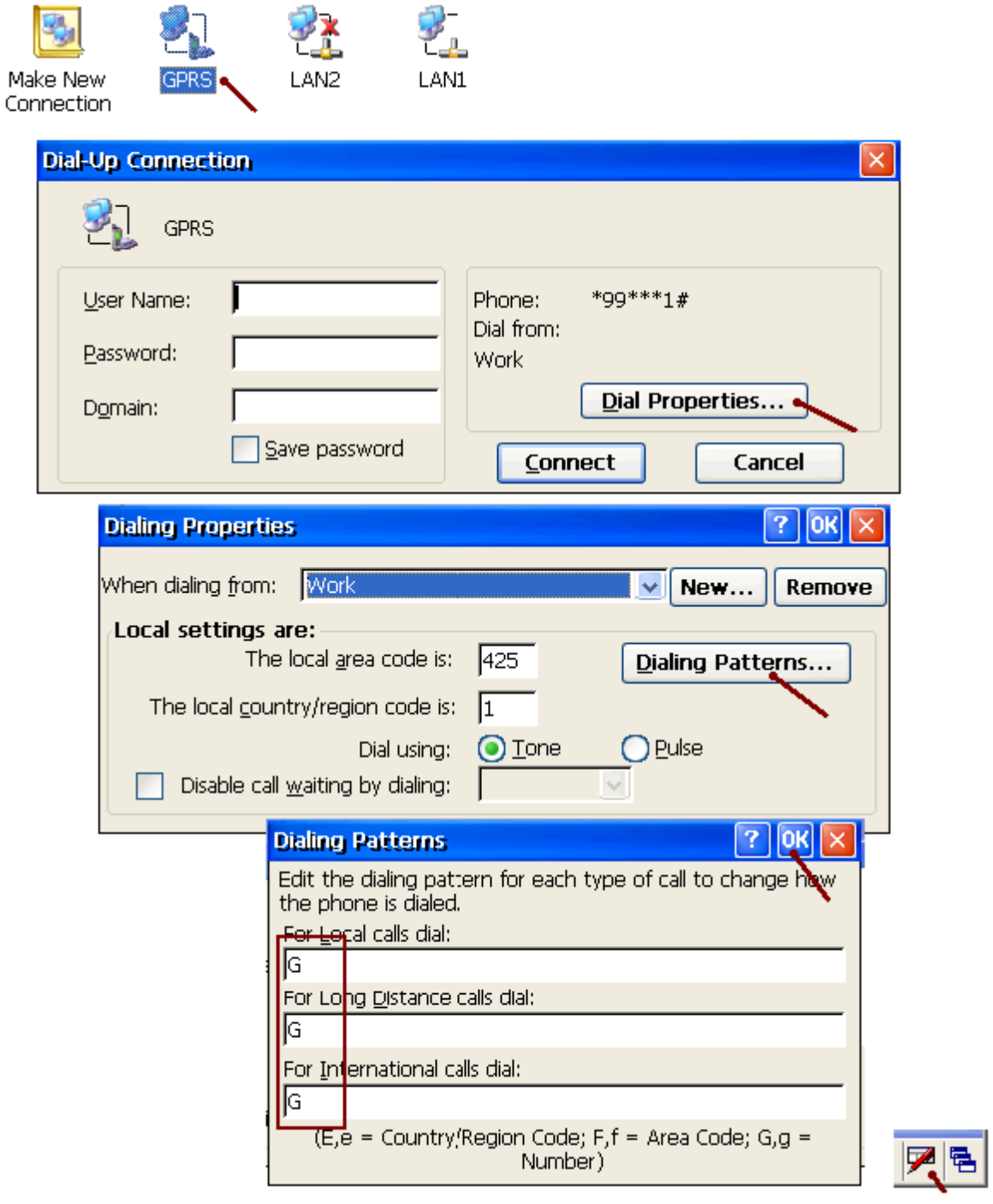
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Then get into the “Security Settings” dialog box and follow the same settings as below. Afterward, type the phone number for GPRS dial-up, and it must fit for the number provided by Telecom Company, and then click “Finish”.



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Next, double-click on the new connection (ex. GPRS) that you have created and get into the "Dial Properties" dialog box, and then get into the "Dialing Patterns" to change the content of those three fields as "G" and click "OK".

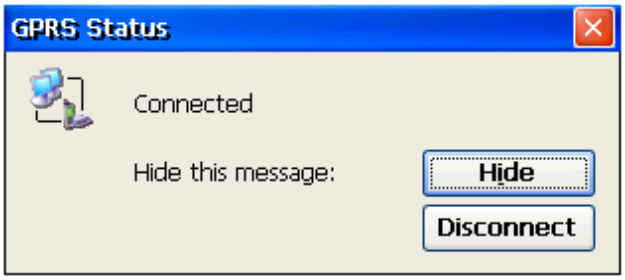


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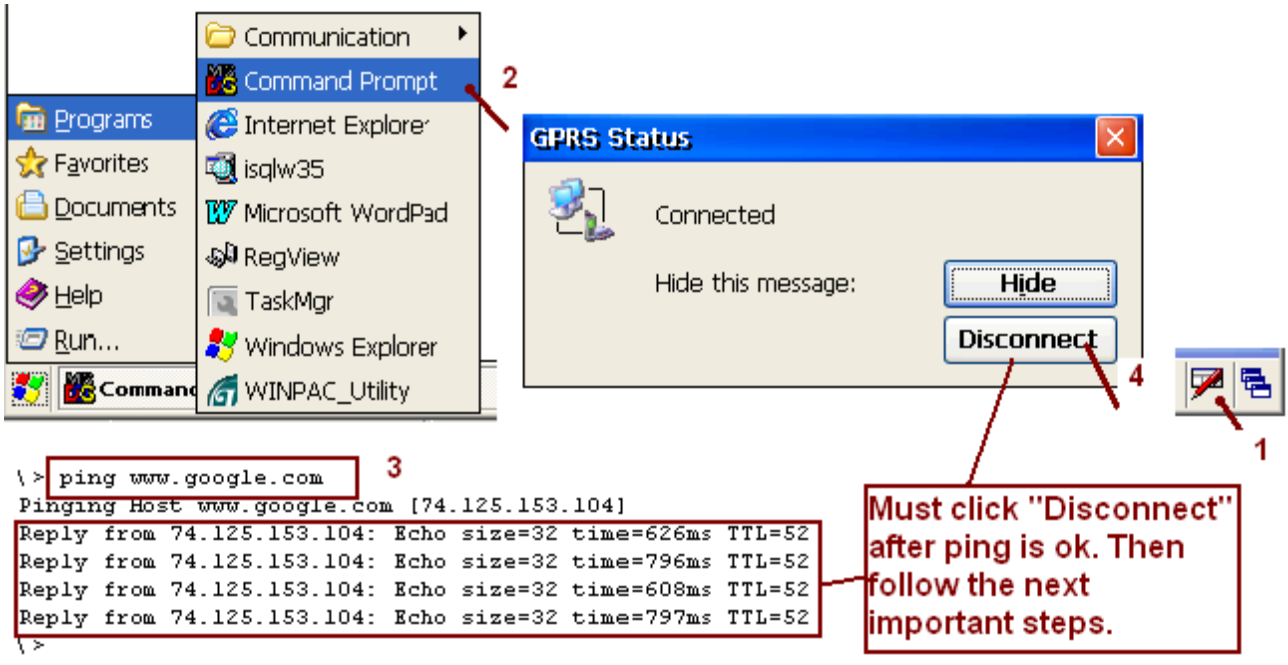
Now, you need to make a dial-up connection to check if the GPRS network is OK. Please type the “User Name” and “Password” that provided by the Telecom Company or online search the word “GPRS APN”. As figure below, we use a Taiwan SIM card for Telecom Company as an example (keep two fields blank) and then click “Connect” to make the I-8212W or I-8213W (plus SIM card) to start dial-up.



If the connection is successful, it will show up “Connected”.



After successfully connecting, open “Command Prompt” and give a ping command to check if the connection is fine (If ping internet fail, refer to the next section 1.2.3). After ping is ok, must run “Disconnect”, then continue the next important steps .

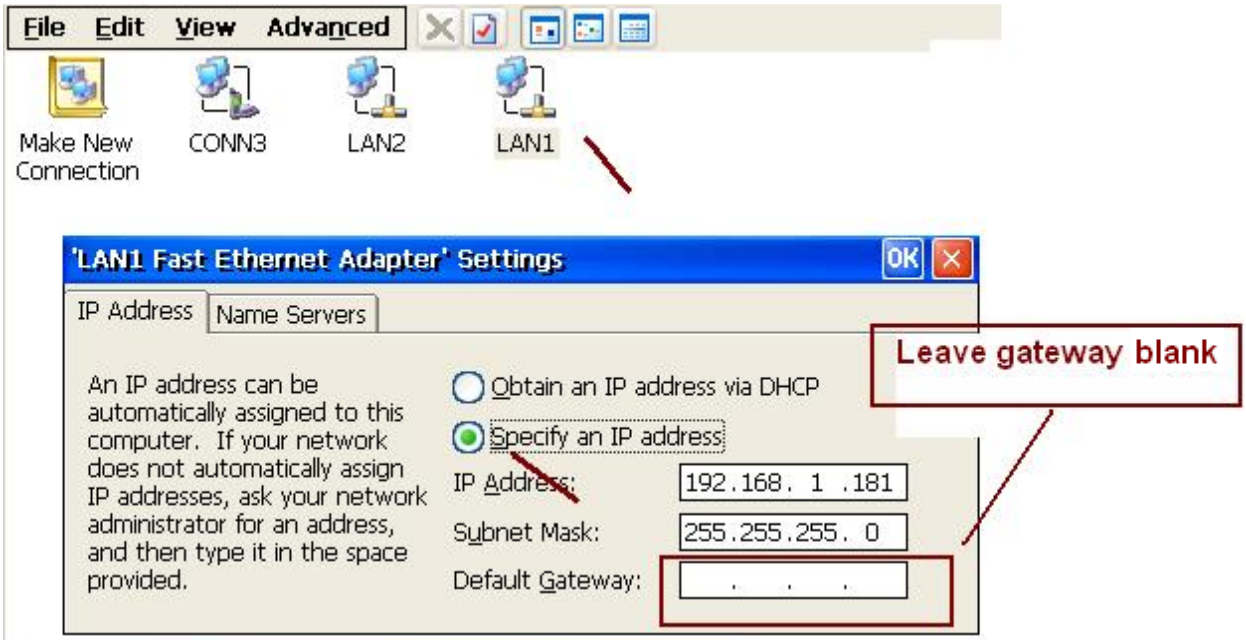


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1.2.3 : Important Configuration (DO NOT ignore it)!!

Please must do the following two important settings.

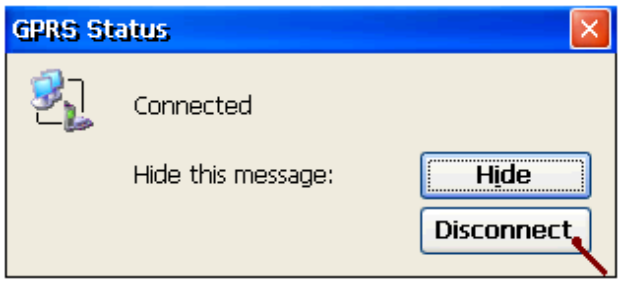
1. If the PAC is going to use the GPRS to go to the internet to send mail, TCP, UDP, data ..., then must clear the gateway settings of LAN1 and LAN2. Or the GPRS will not work. Remember to run the PAC 's utility “File > Save and reboot” once to save the settings.



If your PAC can connect to the Internet by using LAN1 or LAN2, then recommend not to use the GPRS (in such a case, then please set the gateway of LAN1 or LAN2). The reason is LAN1 / LAN2 speed is much faster than the GPRS.

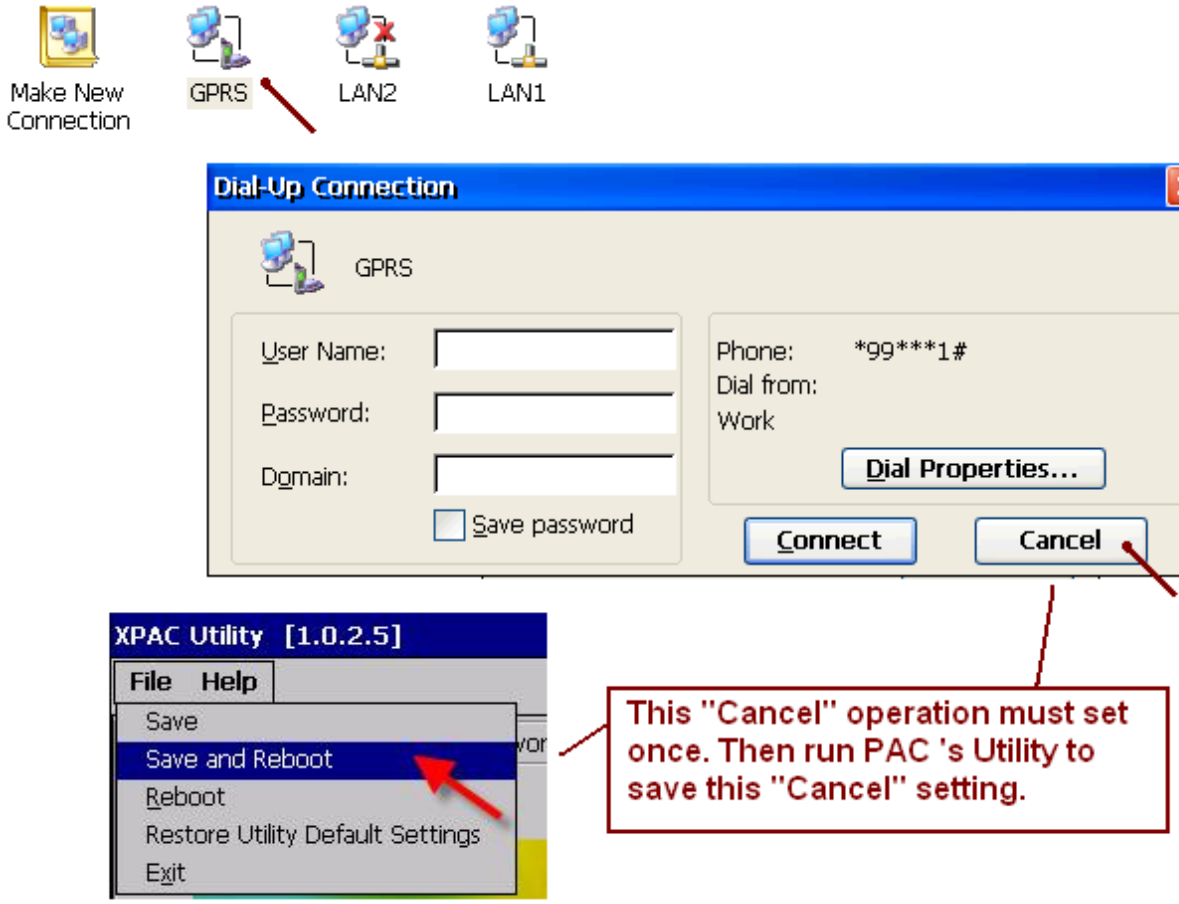
2. In the previous page, the connection has been established. For now, the following configuration is very important and can’t be ignored or else it will cause some problem when you connect to the GPRS network using the ISaGRAF program.

If the status of GPRS connection is still “Connected”, please click the “Disconnect” button first.



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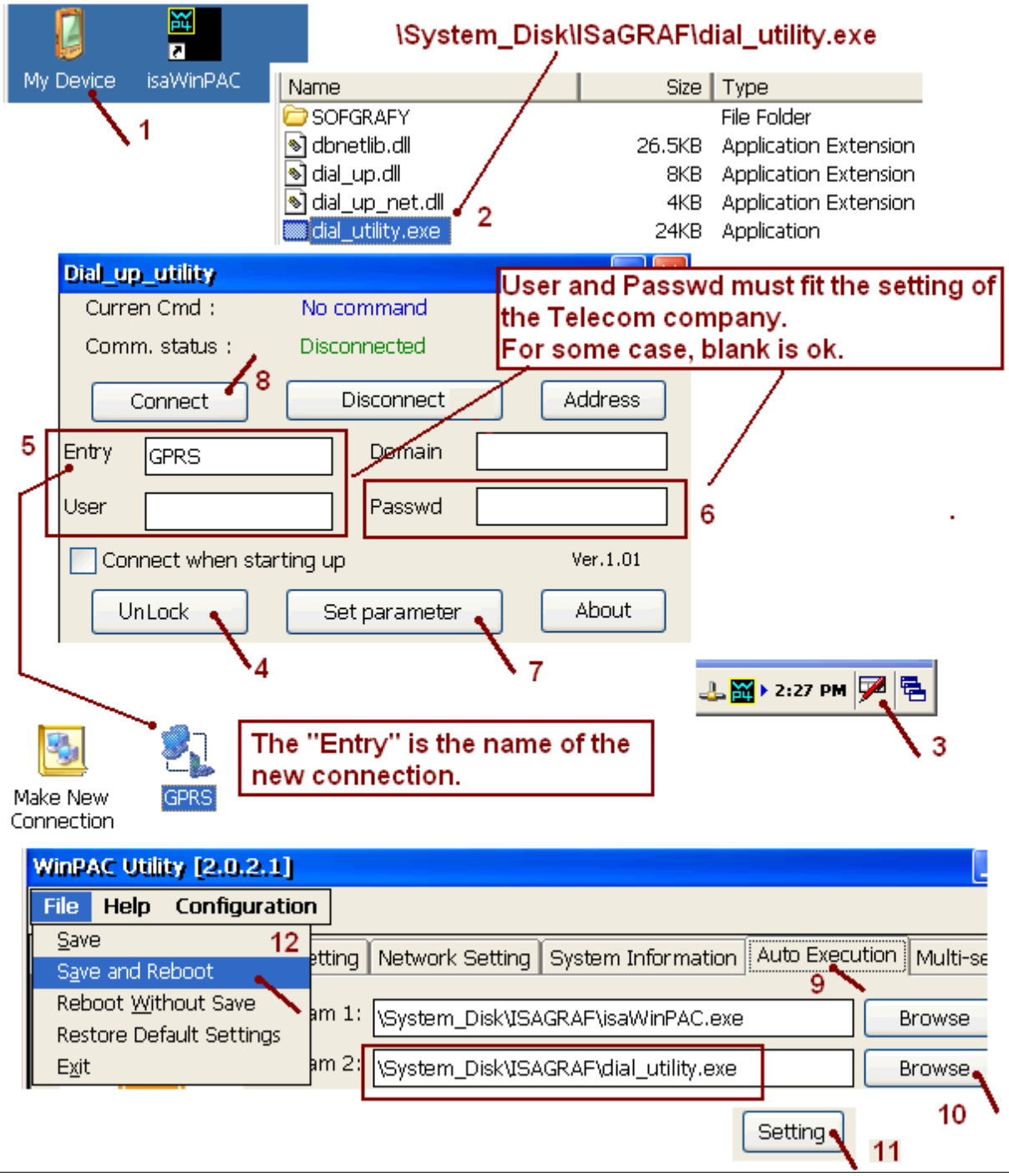
After that, run the new connection (here is GPRS) and then click “Cancel” (At this time, Do Not click “Connect”, you must click “Cancel” first). Finally, run “File > Save and Reboot” in each PAC Utility (ex. “XPAC Utility) to save all the settings (including this and those in the previous section) and then the PAC will restart automatically once.



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1.2.4 : Enable “Dial_up_utility”

“Dial_up_Utility” is a software tool developed by ICP DAS for the GPRS dial-up automatically. It allows an ISaGRAF program (or VB.net、C#.net and C program) to connect or disconnect GPRS by sending commands and it can also read the connection status or command status. Please follow the steps below to enable the “Dial_up_Utility”. Then, click “Connect” to check if the connection is good and click “Disconnect” to check if the connection is broken. Finally, you need to run “…PAC Utility” and add the “dial_utility.exe” to the list of “Auto-Execution” and then run “File > Save and Reboot” to save the settings.



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1.3 : Function Descriptions for Controlling 2G/3G Connection

The ISaGRAF demo program below shows how to use COM_MRTU(999 , TRUE) to connect 2G/3G. Set up “connect_GPRS” as TRUE, it will instruct “Dial_up_utility” to connect 2G/3G.

```
(* connect_GPRS and TMP are declared as Boolean / Internal *)
if   connect_GPRS   then
     connect_GPRS := False ;
     TMP := COM_MRTU( 999 , TRUE ) ;   (* Connect GPRS *)
end_if ;
```

The program below shows the way to use COM_MRTU(999 , FALSE) to stop the 2G/3G. Set up “disconnect_GPRS” as TRUE, it will command “Dial_up_utility” to disconnect.

```
(* disconnect_GPRS and TMP are declared as Boolean / Internal *)
if   disconnect_GPRS   then
     disconnect_GPRS := False ;
     TMP := COM_MRTU( 999 , FALSE ) ;   (* Disconnect GPRS *)
end_if ;
```

The program below shows the way to use COMREAD(999) to read the current status of the 2G/3G connection and use COMREAD(998) to read the current status of the 2G/3G command.

```
(* GPRS_state and GPRS_cmd_type are declared as Integer / Internal *)
(* GPRS status:
   0: No-action, 1 - 7: Connecting, 8: Connected, 9: Disconnected, 10: Others *)
GPRS_state := COMREAD( 999 ) ;
(* GPRS command type: 0: No-action, 1: Connect, 2: Disconnect *)
GPRS_cmd_type := COMREAD( 998 ) ;
```


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The following two usage is supported from the below ISaGRAF driver version.

XP-8xx7-CE6: 1.53 or newer WP-8xx7: 1.74 or newer
VP-25W7/23W7: 1.65 or newer WP-5147: 1.18 or newer

The program below shows the way to use COM_MRTU(998, TRUE) to keep the current 2G/3G connection state when user press “stop application” by PC / ISaGRAF workbench.

```
(* Keep 2G/3G connection state when user press “Stop application” by PC / ISaGRAF
     INIT is Boolean / Internal variable and inited as TRUE
     TMP_BOO is Boolean / Internal *)
 if   INIT   then
      INIT := False ;
      TMP := COM_MRTU( 998 , TRUE ) ;
 end_if ;
```

When the 2G/3G dial-up state is “connected” . The driver will try to ping DNS server and “8.8.8.8”every 15 minutes to test if the 2G/3G communication is ok. If both ping timeout at 15 seconds later, the ISaGRAF PAC will automatically reset the 2G/3G module and then re-dial-up to recover the 2G/3G communication .

If user don't want to ping this“8.8.8.8”, can modify it to ping one another ip address (for example, 192.168.71.9) . Like as below code.

```
(* set to ping one another IP address .
     INIT is Boolean / Internal variable and inited as TRUE
     TMP_BOO is Boolean / Internal *)
 if   INIT   then
      INIT := False ;
      TMP_BOO := COM_MRTU( net_addr('192.168.71.9') , TRUE ) ;
 end_if ;
```

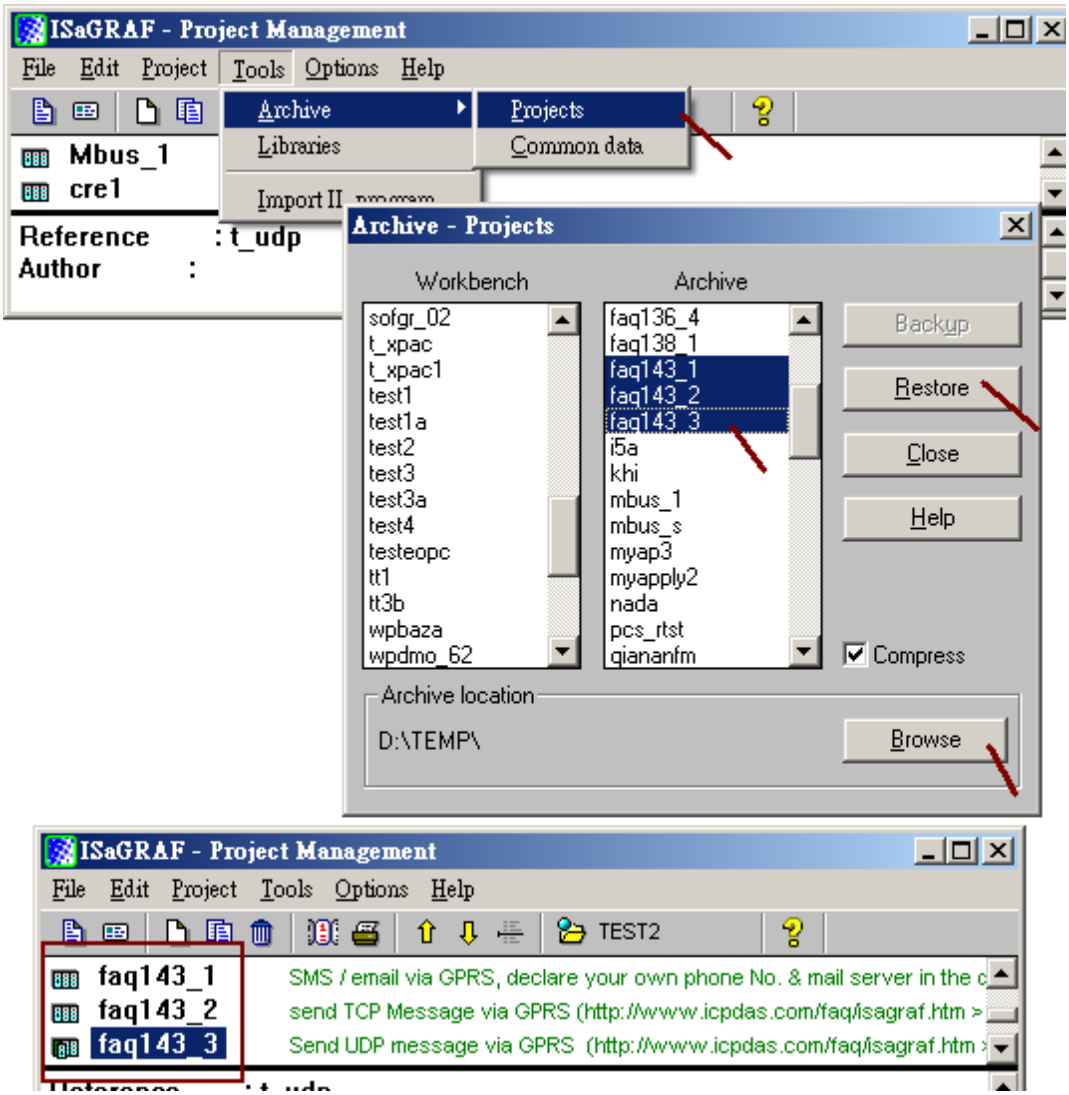

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1.4 : GPRS Demo Programs

User can download related files from https://www.icpdas.com/en/faq/index.php?kind=280#751 **> 143**, faq143_demo_english.zip, including three ISaGRAF demo files - faq143_1.pia、faq143_2.pia and faq143_3.pia, please follow the steps to restore the files into your PC (ISaGRAF) as below figure.

Note: Please refer to the https://www.icpdas.com/en/faq/index.php?kind=280#751 **> FAQ-151** for the application to deliver files to a remote ftp-server in a PC on the Internet.

Note: Please refer to the section 1.5 of this paper for the GPS function built in the I-8213W and I-8213W-3GWA.



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1.4.1 : Demo FAQ143_1 : Send an email with one attached file by GPRS

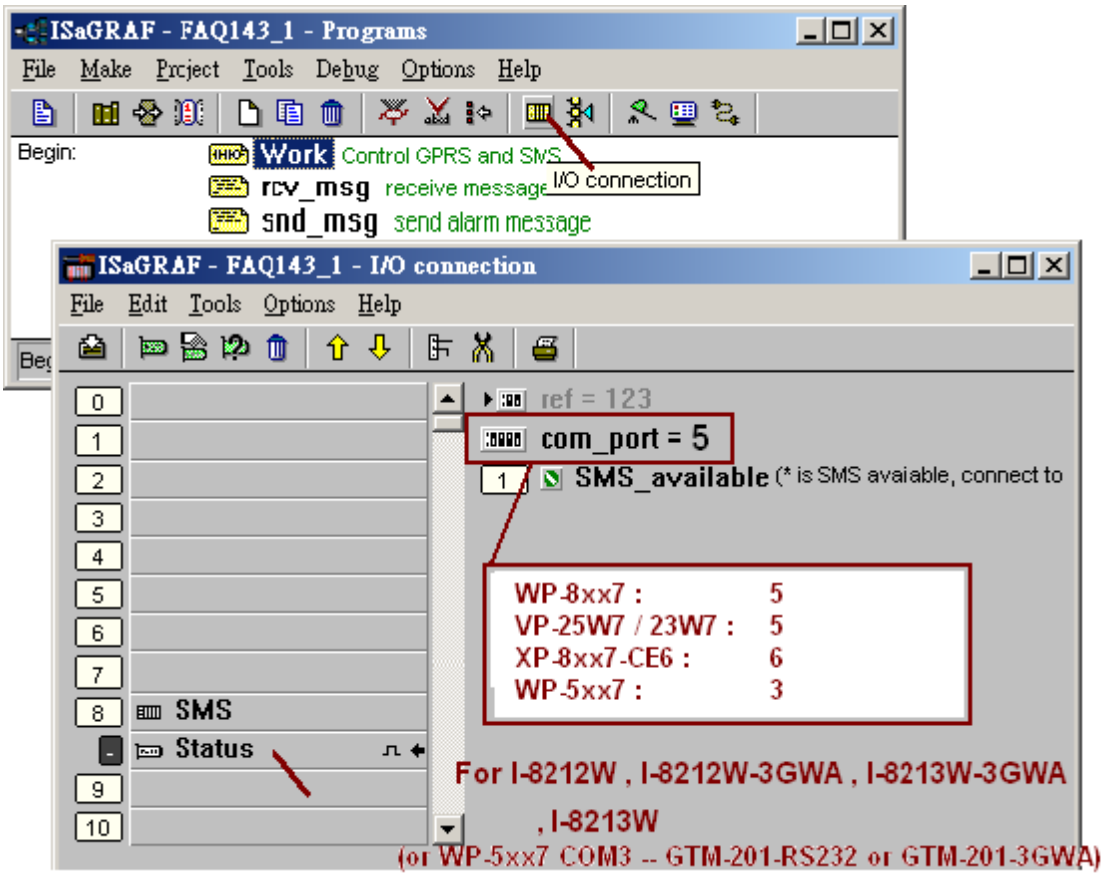
In the demo FAQ143_1, you can send or receive a short message from cell phone by using the I-8212W or I-8213W (plus SIM card) and you can also send an email with one attached file by connecting GPRS.

If you want to know “how to send/receive a short message from your cell phone to ISaGRAF PAC?”, please refer to https://www.icpdas.com/en/faq/index.php?kind=280#751 **> FAQ-111**.

If you want to know “how to send an email by ISaGRAF PAC?”, please refer to https://www.icpdas.com/en/faq/index.php?kind=280#751 **> FAQ-067**.

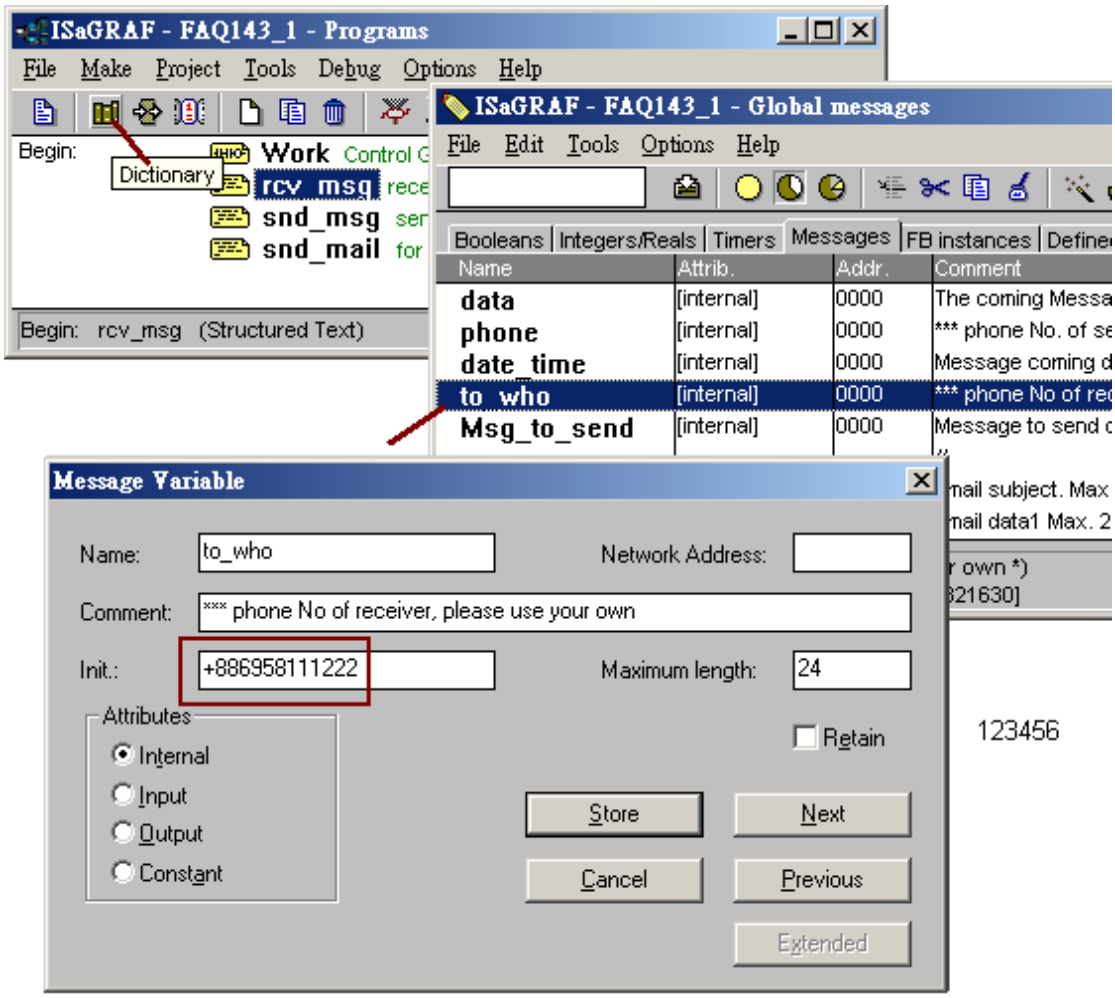
First, please modify the program - faq143_1 to fit for your application environment.

1. Please get into the “IO connection” dialog box, modify the “com_port” number used for the SMS.



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2. Click the “Dictionary” button and modify the initial value (the phone number of the SMS receiver) of Message variable (to_who).

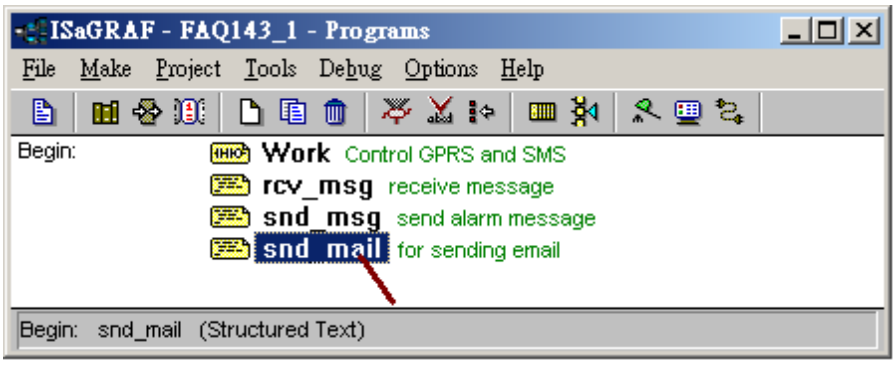


3. Modify the following contents in the program (snd_mail).

TMP := MAIL_SET(1 , **'father@icpdas.com'**) ; (* Modify email receiver & address *)

TMP := MAIL_SET(100 , **'go_mao@hotmail.com'**) ; (* Modify email addresser & address *)

TMP := MAIL_SET(101 , **'168.95.4.211'**) ; (* Modify the usable mail server IP in the area *)



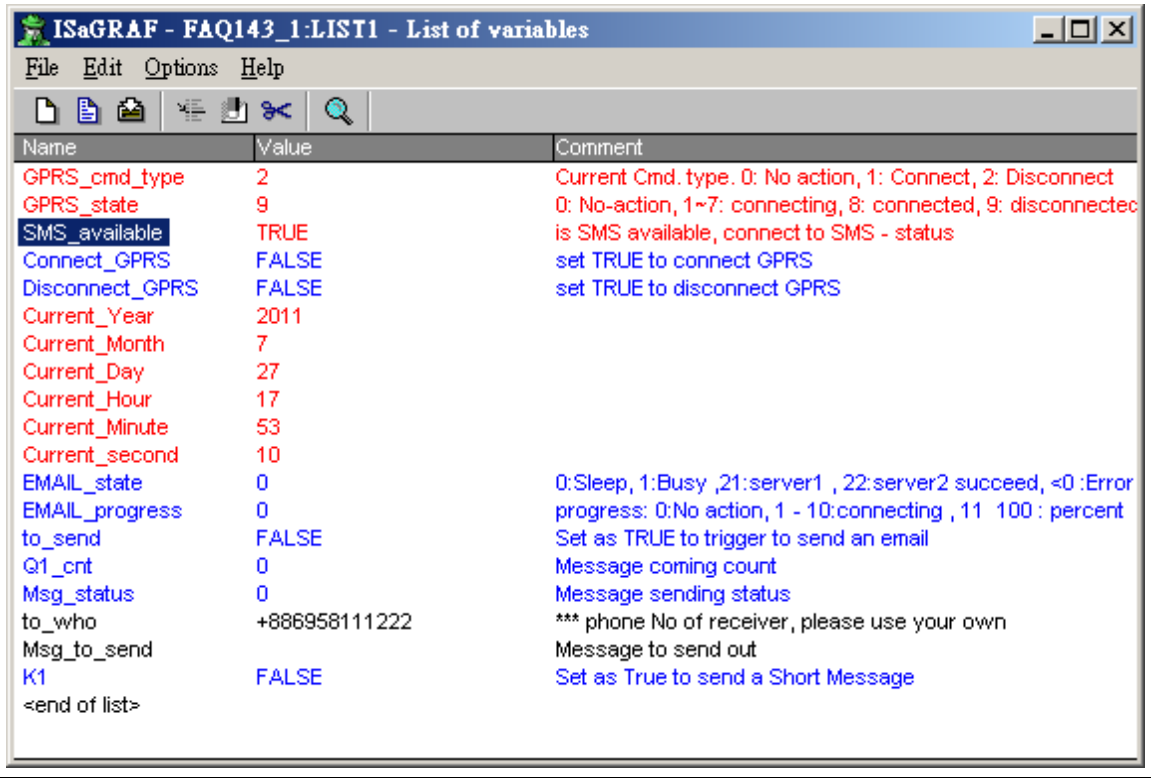
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How to test the demo program - faq143_1 ?

After finished the modifications of step (1) to (3), please re-compile the program (faq143_1) once to confirm it is correct and then download it to your ISaGRAF WinCE PAC to run. When the connection between the PC (ISaGRAF) and your PAC is normal, the window (as figure below) will show up on the PC screen. If "SMS_available" is "TRUE" that means the connection between PAC and I-8212W (plus SIM card) has been established and now you can send or receive the short message. Please set "K1" as "TRUE", it will start sending a text message to the phone number of "to_who" and then auto set "K1" as "False" immediately. Then, you will see the "Msg_status" value is slowly changing from 1 to 21, that means the sending is successful.

If you want to send an email via the GPRS connection, please set the "Connect_GPRS" as "TRUE" (the settings will auto return to "False" immediately). Now, you will see the "GPRS_cmd_type" changed to 1 (Connect) and the "SMS_available" changed to "FALSE", then the "GPRS_state" will change too. If the "GPRS_state" value finally changes to "9" that means "disconnected" (bad GPRS connection) and if the value is "8" that means "connected" (successful GPRS connection). After connecting the GPRS successfully, you can send an email by setting up the "to_send" as "TRUE" (the settings will auto return to "False" immediately). Before sending the email, the PAC will start to search LAN1, LAN2 and GPRS connection. If the PAC's LAN1 & LAN2 unable to connect to internet (such as the gateway of LAN1 or LAN2 is not set), it will try to send mail by GPRS connection finally. Now, you will see the "EMAIL_progress" value increased slowly from 1 to 100, "100" means the email has been sent out completely (100%). For the next sending, the email will be sent out via GPRS directly.

If you want to break the GPRS connection, please set the "Disconnect_GPRS" as "TRUE" (the settings will auto return to "False" immediately) and you will see the "GPRS_cmd_type" changed to "2 (disconnect)" and the "GPRS_state" value changed to "9 (disconnected)". After some time, the SMS will resume available and you will see the "SMS_available" changed to "TRUE". If it is unable to work correctly, please refer to the section 1.1 & 1.2 to confirm all the settings are correctly and refer to the section 1.4.1 to check if you had modified the demo program to fit for your regional settings.



Name	Value	Comment
GPRS_cmd_type	2	Current Cmd. type. 0: No action, 1: Connect, 2: Disconnect
GPRS_state	9	0: No-action, 1~7: connecting, 8: connected, 9: disconnectec
SMS_available	TRUE	is SMS available, connect to SMS - status
Connect_GPRS	FALSE	set TRUE to connect GPRS
Disconnect_GPRS	FALSE	set TRUE to disconnect GPRS
Current_Year	2011	
Current_Month	7	
Current_Day	27	
Current_Hour	17	
Current_Minute	53	
Current_second	10	
EMAIL_state	0	0:Sleep, 1:Busy ,21:server1 , 22:server2 succeed, <0 :Error
EMAIL_progress	0	progress: 0:No action, 1 - 10:connecting , 11 100 : percent
to_send	FALSE	Set as TRUE to trigger to send an email
Q1_cnt	0	Message coming count
Msg_status	0	Message sending status
to_who	+886958111222	*** phone No of receiver, please use your own
Msg_to_send		Message to send out
K1	FALSE	Set as True to send a Short Message
<end of list>		

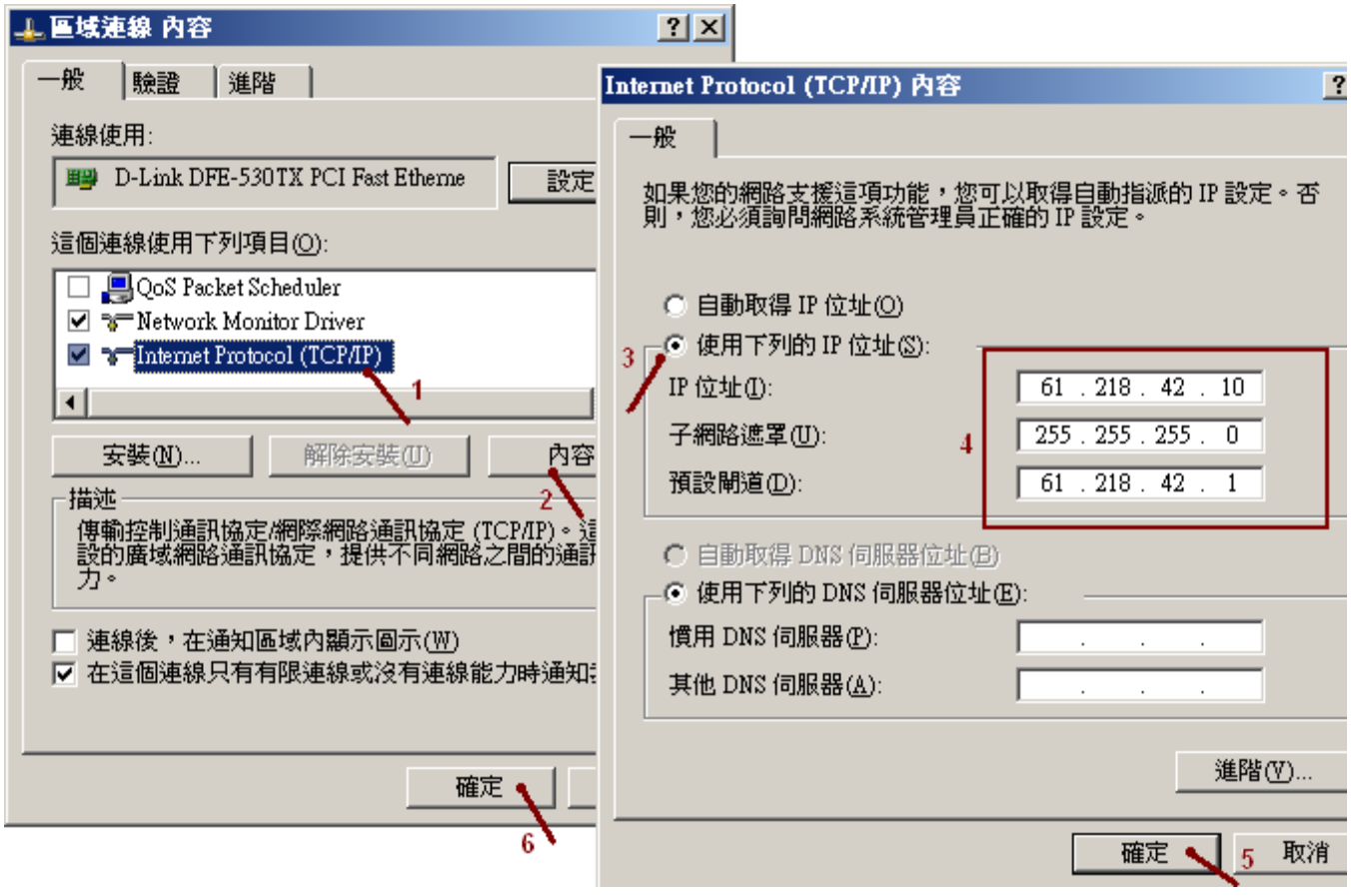
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1.4.2 : Demo FAQ143_2: Send and Receive TCP String (Message) or binary Data by GPRS

The demo program (FAQ143_2) allows connecting the GPRS via I-8212W or I-8213W (plus the SIM card), and then the ISaGRAF PAC can connect to the remote TCP Server via enabling the TCP Client function. When the TCP Client and the TCP Server are online working, the ISaGRAF PAC can send string data (Message, String, one string packet contains up to 255 bytes) or binary data (one binary packet contains up to 512 bytes), and it can also receive the string and binary data from the remote Server (but the receiving function only works while a TCP connection is established). For more information about "How to enable the TCP Client function of ISaGRAF PAC", please refer to the "ISaGRAF User's Manual" - Section 19.3.

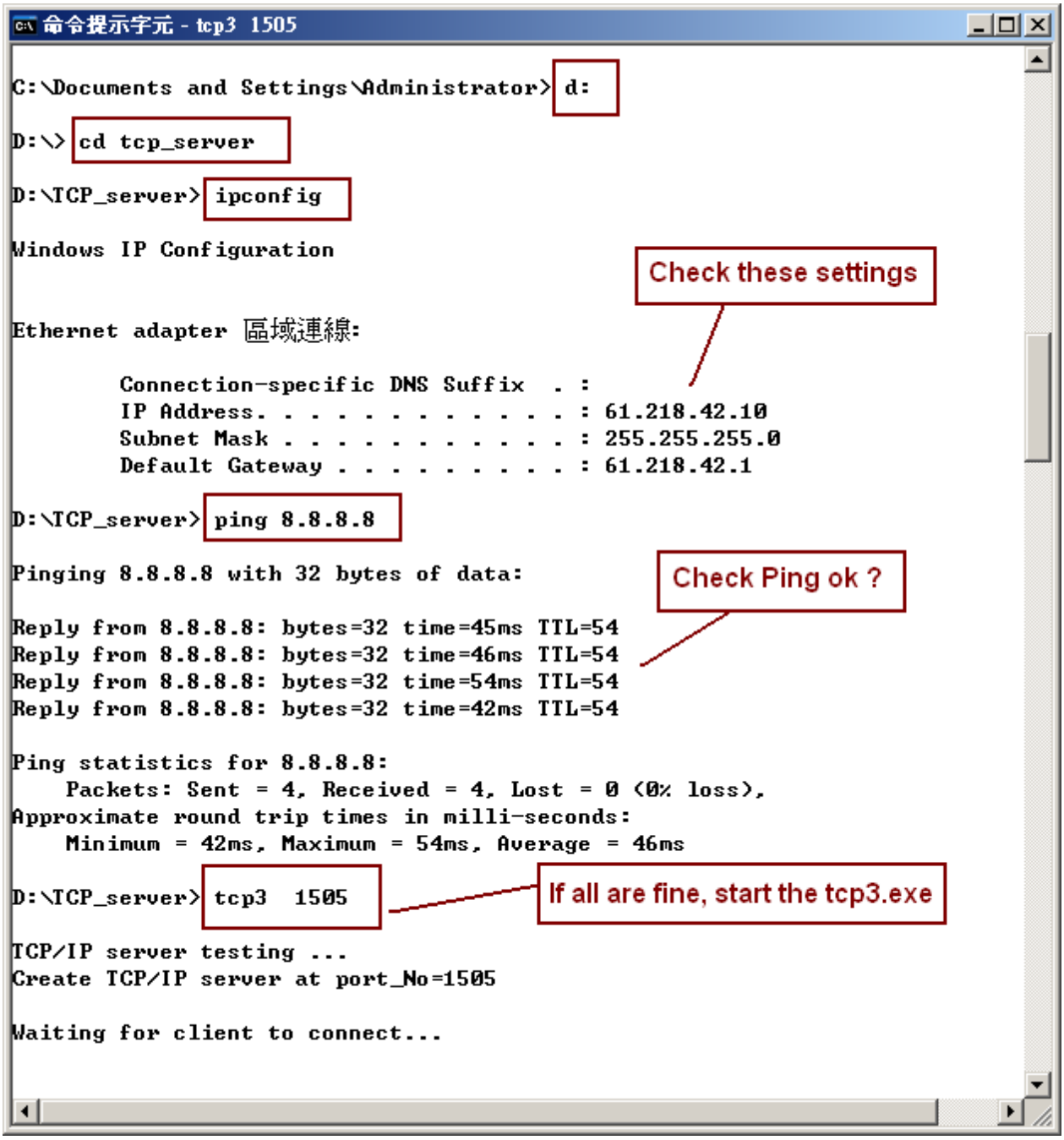
For testing the program (faq143_2), you need to prepare a PC as TCP server and apply for a fixed Internet IP (provided by a Telecom Company) and then you can run a TCP Server test program (Tcp3.exe). The file is in the "faq143_demo_english.zip" (you can download it from our website: https://www.icpdas.com/en/faq/index.php?kind=280#751 **> 143**). Please refer to the following operation to enable the TCP Server.

At first, set up the Internet IP、Subnet mask and Default gateway for the PC (TCP Server).



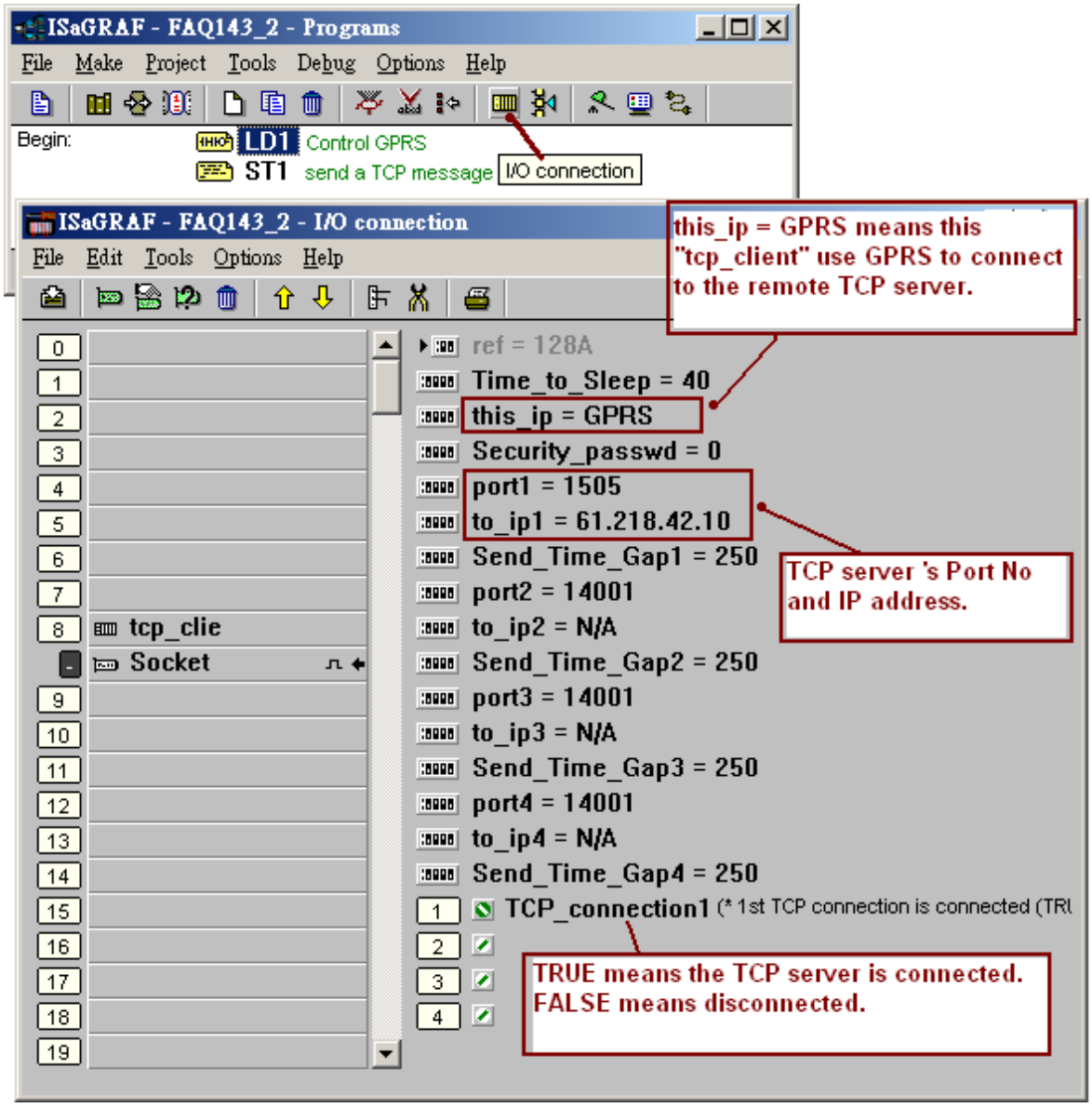
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Please copy the file (Tcp3.exe) into a path (such as D:\TCP_server\). Next, open the “Windows Command Prompt” and get into D:\TCP_server\ (as the figure below), then type “ipconfig” to check if the settings are correctly. Afterward, using “ping 8.8.8.8” command or ping other website IP to check if the network connection is good. If all of the above operation is correct, please type “Tcp3 1505” to run the test program for TCP Server at Port_No 1505. (Due to the ISaGRAF demo program (faq143_2) instruct to connect to the TCP Server at Port_No. 1505).



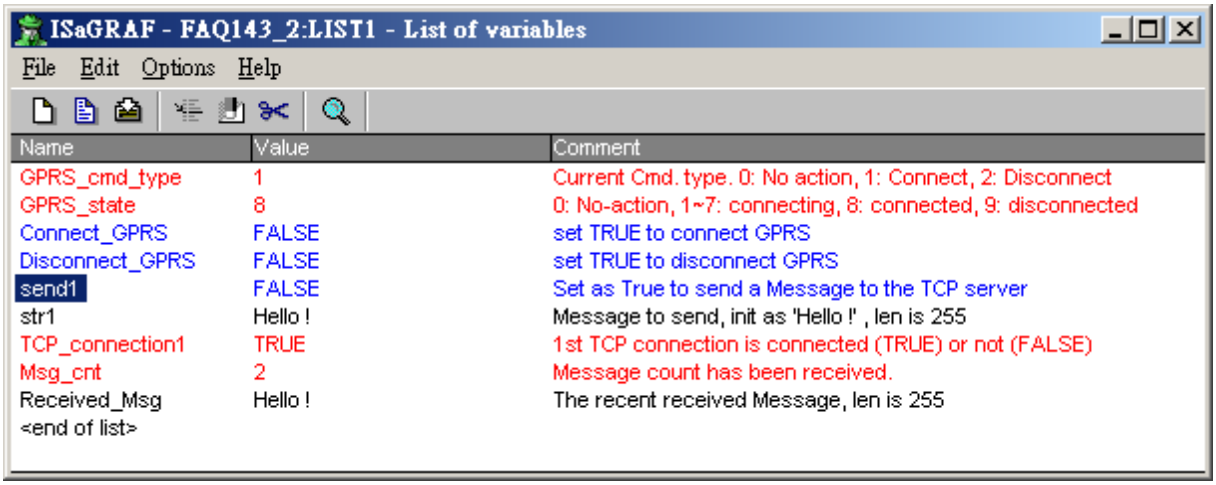
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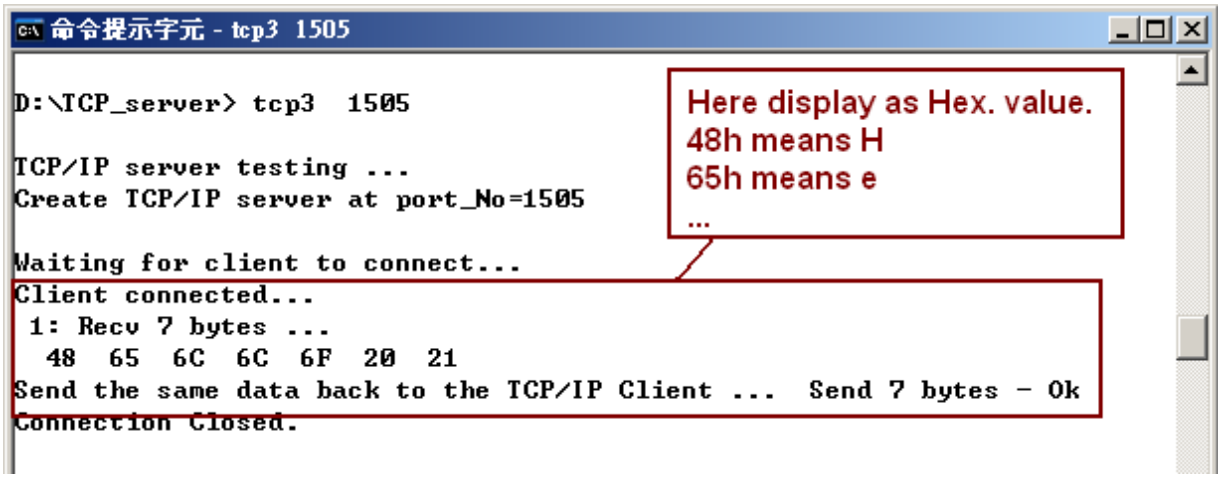
Then, modify the ISaGRAF demo program (faq143_2) to fit for your test environment. The configurations are similar as below and then compile the program.



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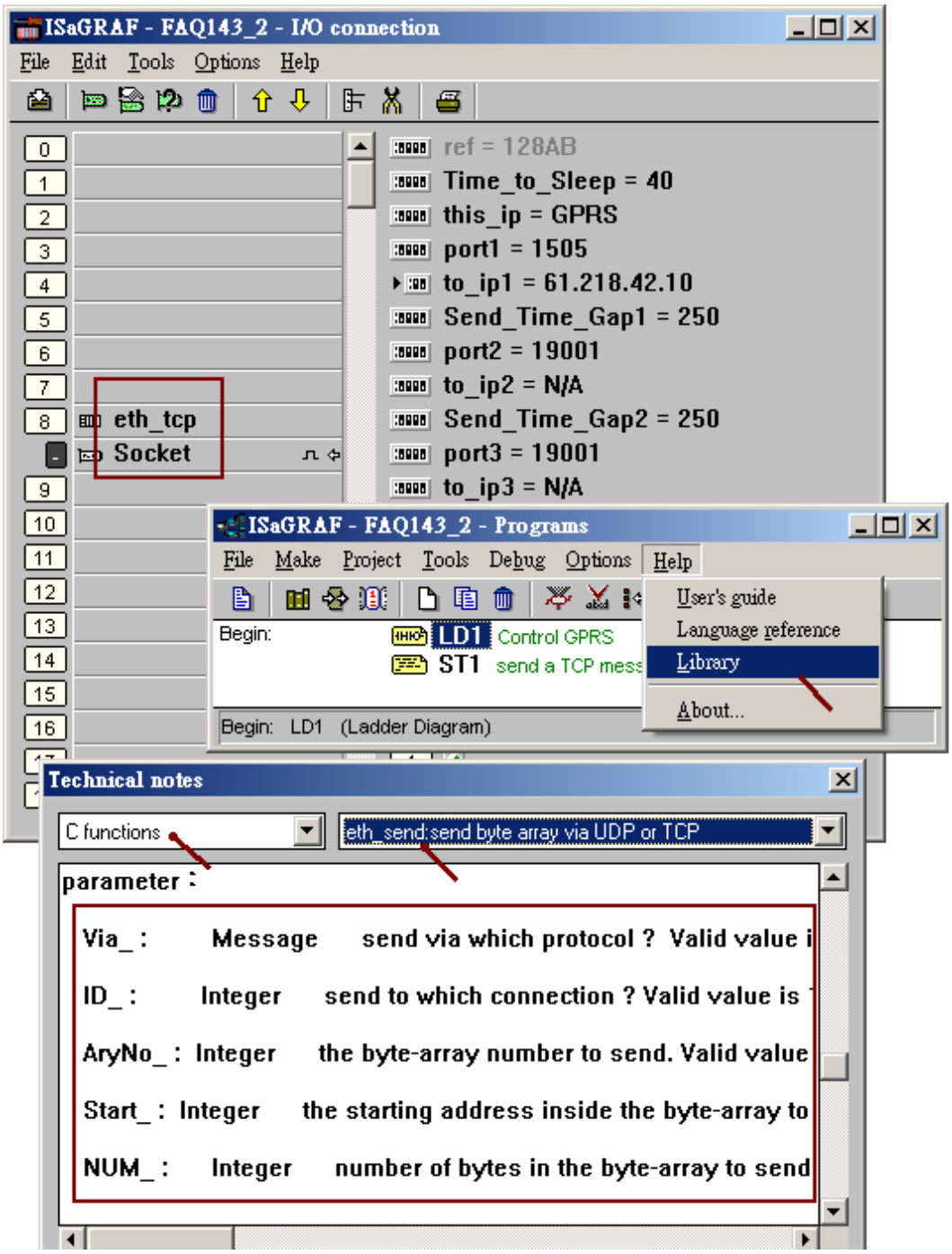
For now, download the ISaGRAF demo program (faq143_2) to the ISaGRAF WinCE PAC by using another PC, if the operation is correctly the window will show up as below. Please set the “Connect_GPRS” as “TRUE” (the settings will auto return to "False" immediately), it will start to connect the GPRS. If the “GPRS_state” is “8” that means it can access GPRS connection (“9”, stands for disconnected). Then, set “Send1” as “TRUE” (the settings will auto return to "False" immediately) and it will start to connect to the TCP Server and send an ISaGRAF Message (in this example, it sends “Hello !” to the remote TCP Server). If the connection is normal, the “TCP_connection1” value will change to “TRUE” and the “Tcp3” test program will show up the received data on the PC screen (TCP Server). It will reply the same message to the ISaGRAF PAC and you will see the “Msg_cnt” value plus one, then the “Msg_cnt” value will equal the message you just sent out.





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If you want to send the binary data via TCP_cliet, you need to enable the “eth_tcp” function (one TCP packet can transmit up to 512 bytes and you can send data by using “eth_send” function).



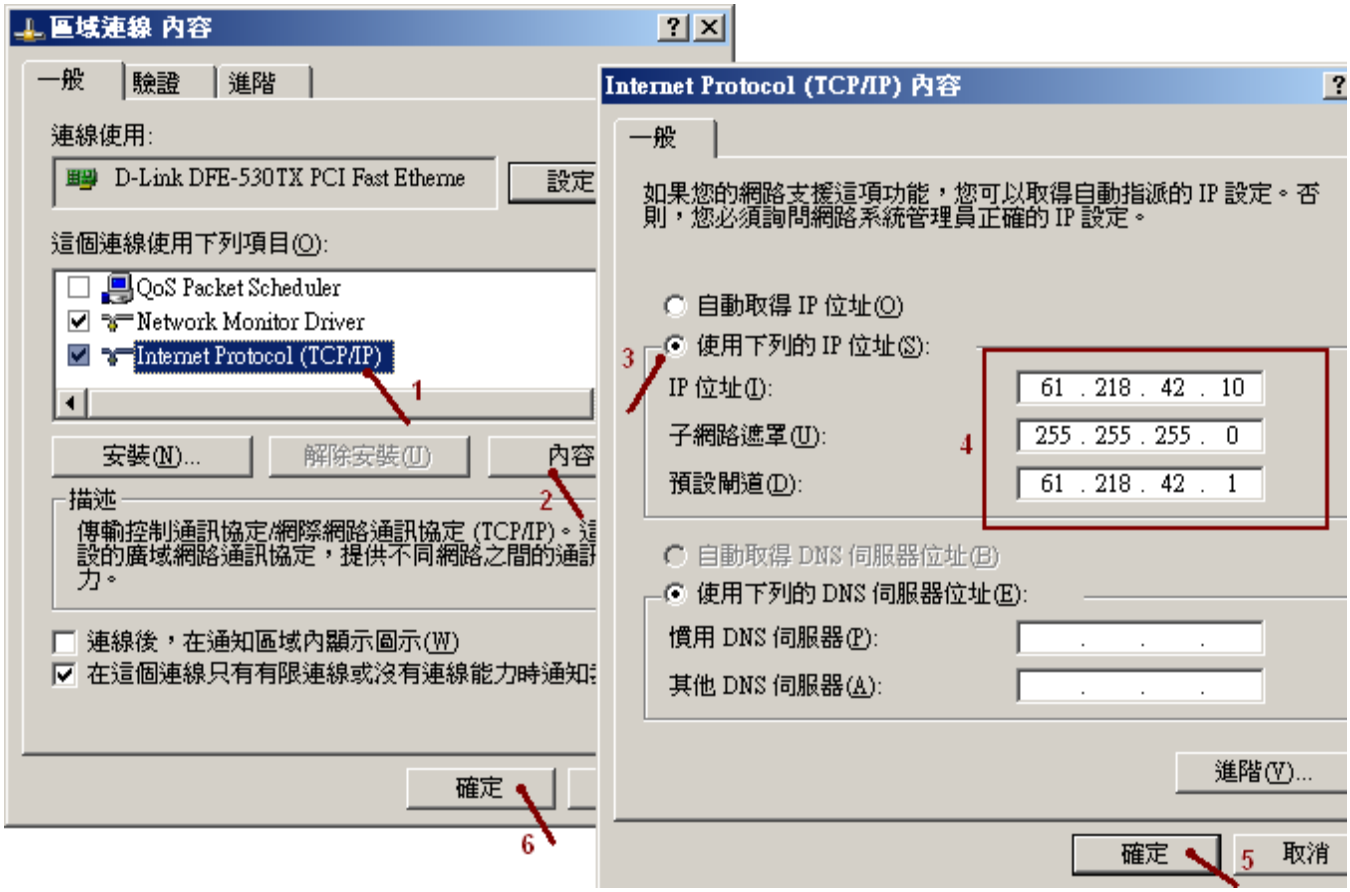
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1.4.3 : Demo FAQ143_3 : Send UDP String (Message) by GPRS

In the demo program - FAQ143_3, after connecting the GPRS by using I-8212W or I-8213W (plus the SIM card), the ISaGRAF PAC can send a string data (Message, String, one string packet contains up to 255 bytes) to the remote UDP Server via enabling the UDP function. UDP is a connectionless protocol that is different from TCP (In the section 1.4.2). For more information about "How to enable the UDP function of ISaGRAF PAC", please refer to the "ISaGRAF User's Manual" - Section 19.2.

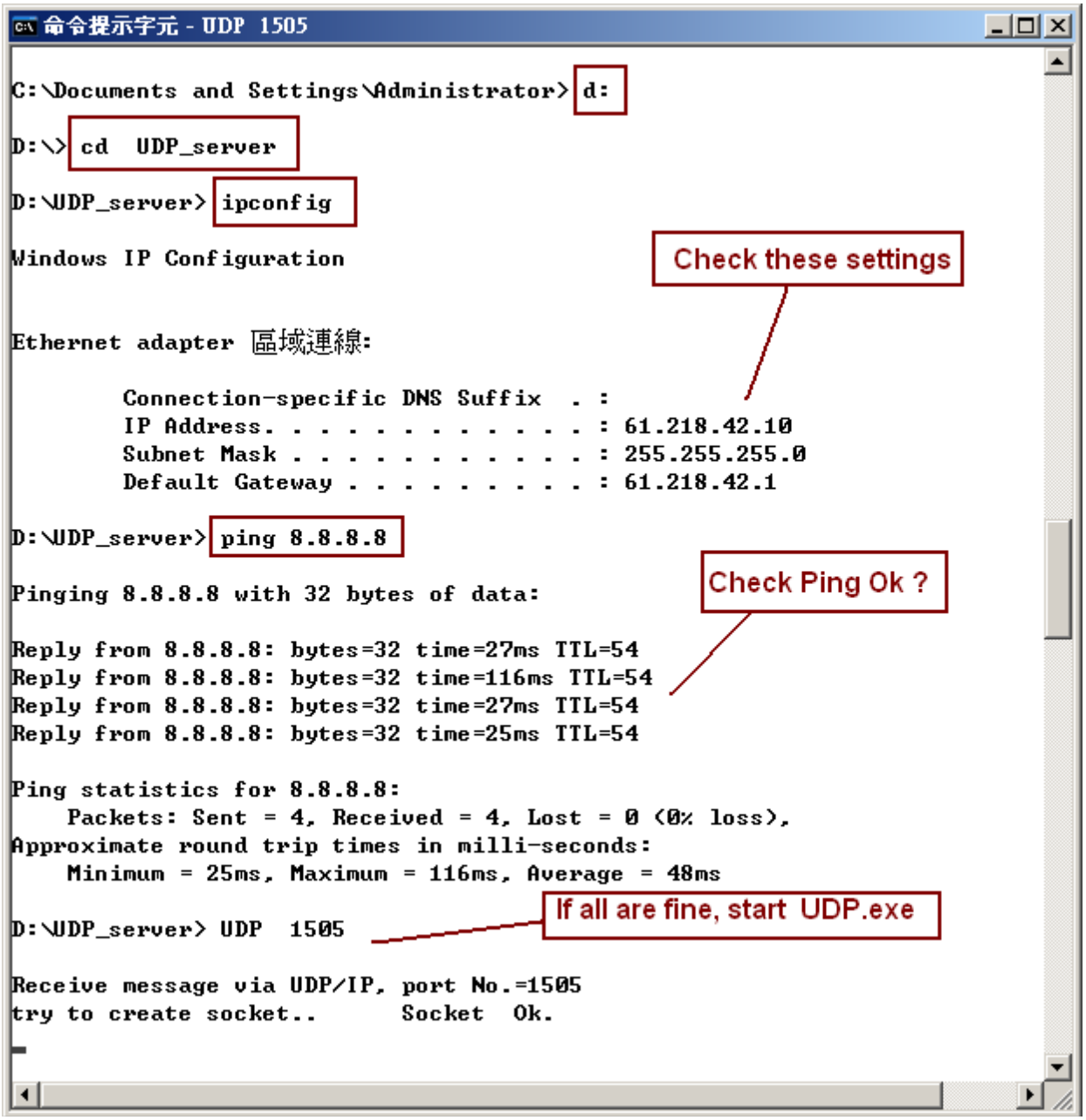
For testing the program - faq143_3, you need to prepare a PC as a UDP server and apply for a fixed Internet IP (provided by a Telecom company). Then, you can run a test program (UDP.exe) for UDP Server and the program is in the "faq143_demo_english.zip" (you can download it from our website: https://www.icpdas.com/en/faq/index.php?kind=280#751 **>** **143**). Please refer to the following operation to enable the UDP Server.

At first, please set up the Internet IP、Subnet mask and Default gateway for the PC (UDP Server).



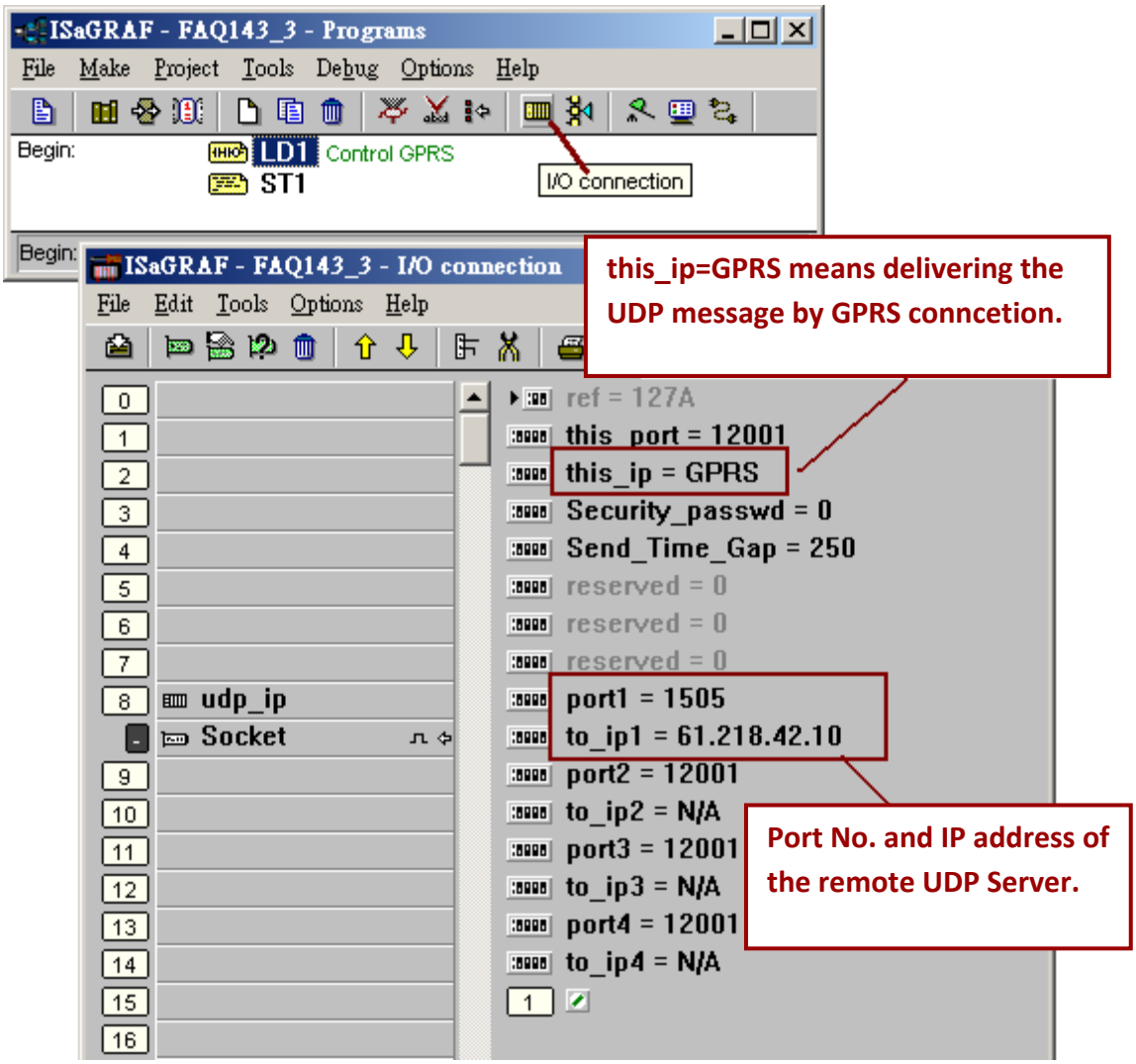
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Please copy the file (UDP.exe) into a path (such as D:\UDP _server\). Next, open the “Windows Command Prompt” and get into D:\UDP_server\ (as figure below), then type “ipconfig” to check if the settings are correctly. Afterward, using “ping 8.8.8.8” command or ping other website IP to check if the network connection is good. If all of the above operation is correct, please type “UDP 1505” to run the UDP Server test program at Port_No 1505. (Due to the ISaGRAF demo program (faq143_3) instruct to send data to the UDP Server at Port_No. 1505)



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Then, modify the ISaGRAF demo program - faq143_3 to fit for your test environment, it is similar to the figure below and then compile the program.



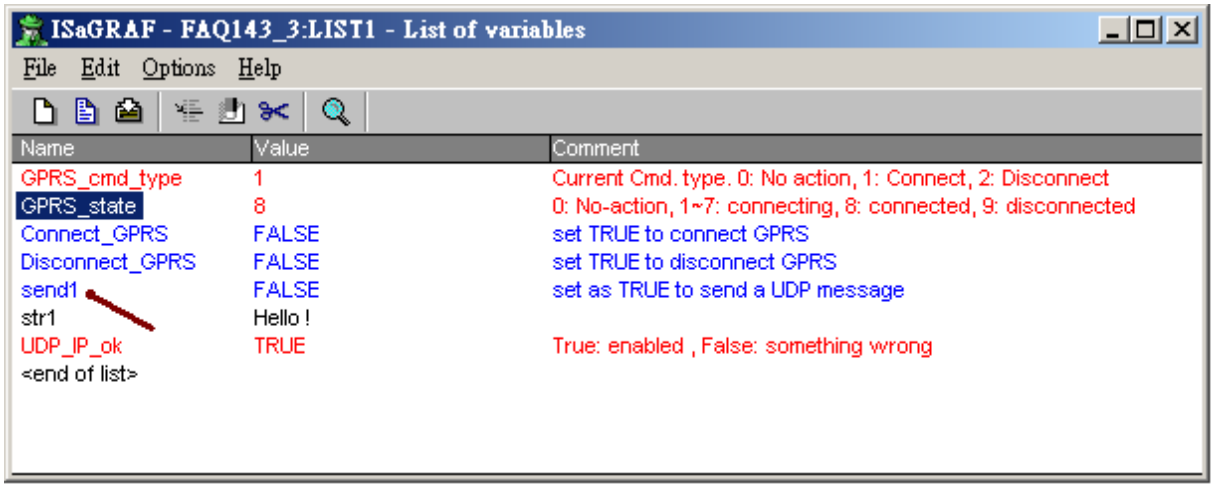
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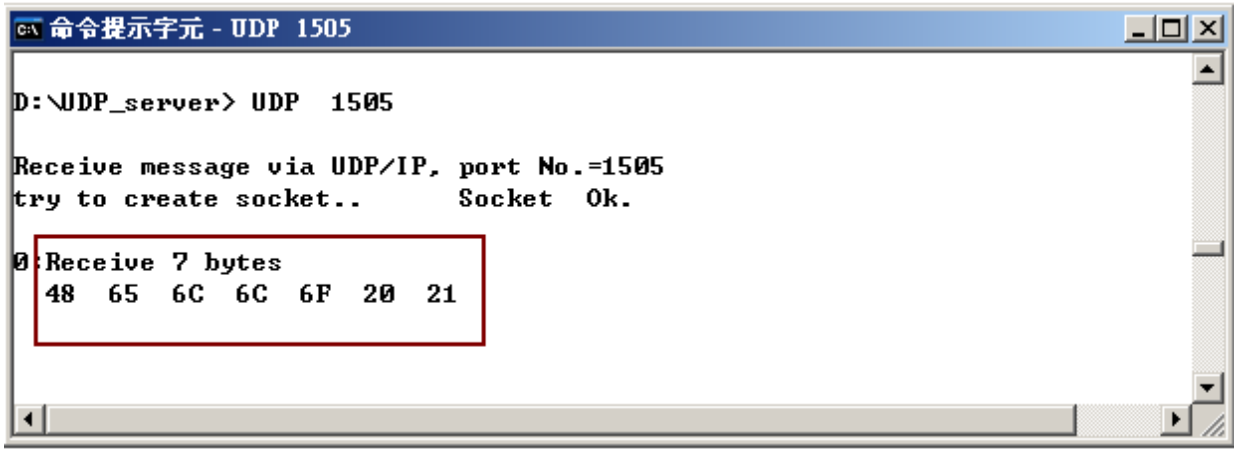
Next, please download the ISaGRAF demo program - faq143_3 to your ISaGRAF WinCE PAC by using another PC. If it is normal, it will show up the window as below.

Set the “Connect_GPRS” as “TRUE” (the settings will auto return to "False" immediately) and it will start to connect the GPRS. If the “GPRS_state” is “8” that means it has connected to the GPRS (“9” stand for disconnected). If it is properly connected to the GPRS, the value of “UDP_IP_ok” will become to “TRUE”.

Then, set “Send1” as “TRUE” (the settings will auto return to "False" immediately) and it will send out an ISaGRAF Message (in this example, it sends “Hello !” to the remote UDP server).

Now, the message you sent will show up on the PC screen (UDP Server).

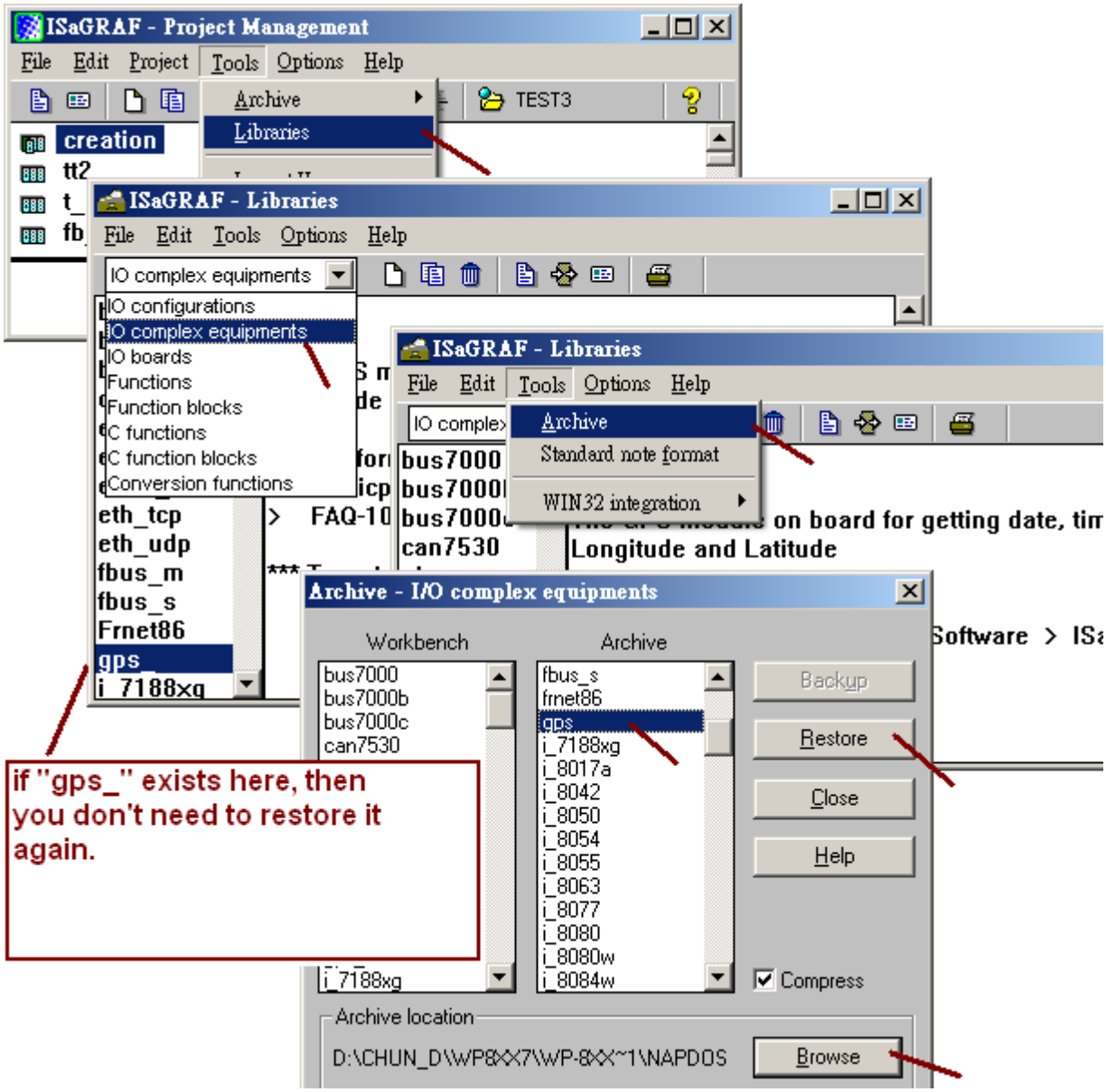




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1.5 : Using the GPS function built in the I-8213W and I-8213W-3GWA

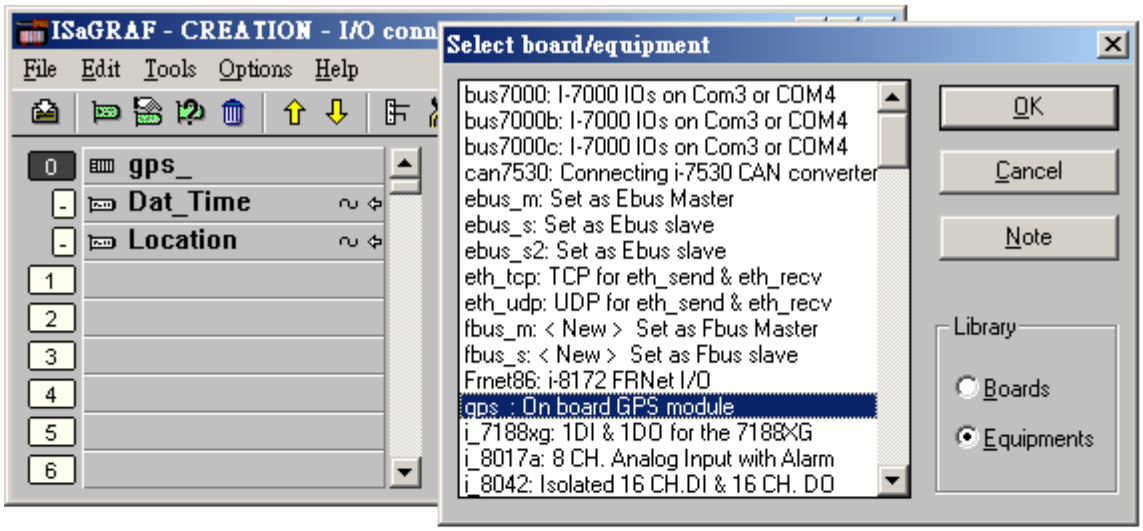
The I-8213W and I-8213W-3GWA support both of the GPRS and GPS. To use the GPS function of these two cards, first refer to the setion 1.1 of this document to well configure the MSA1 and MSA2 serial ports in the WP-8xx7 (or VP-25W7, XP-8xx7-CE6) . Then make sure your PC / ISaGRAF has the “gps_” installed. If it is not, follow the following steps to restore it to the PC / ISaGRAF. You can find the“gps_.xia” in the ZIP file downloaded at https://www.icpdas.com/en/faq/index.php?kind=280#751 > 143 .

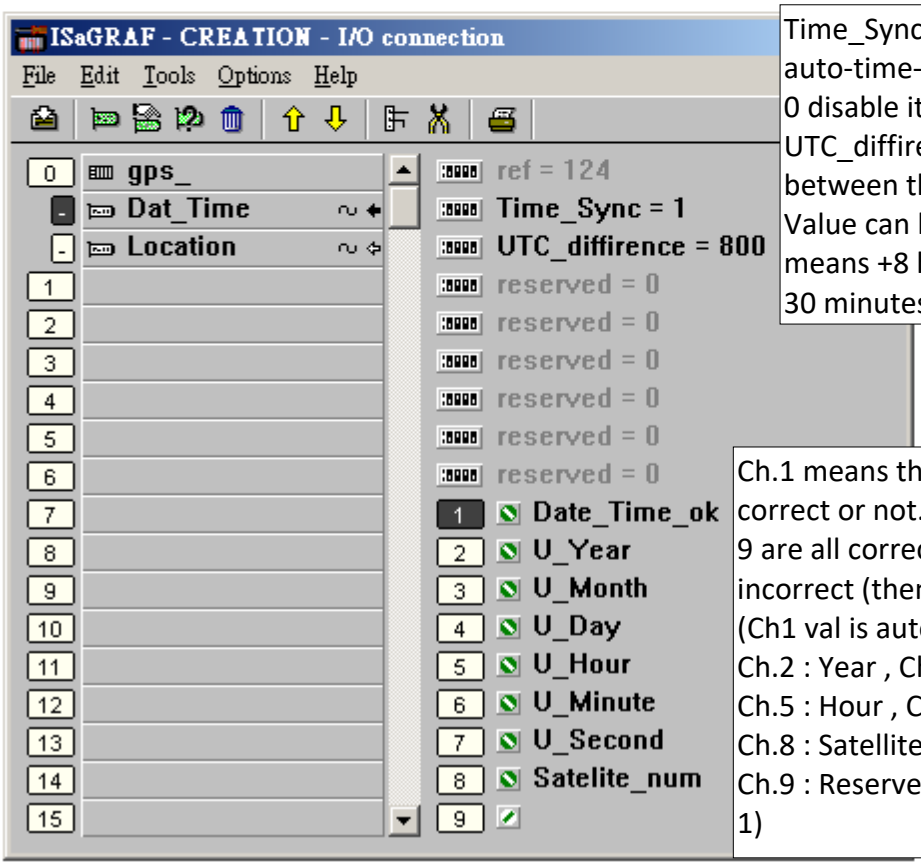


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Then connect the“gps_”in the IO connection of your ISaGRAF project. The definition of each integer input channel is as the following figure.

(Next page for the definition of the location)

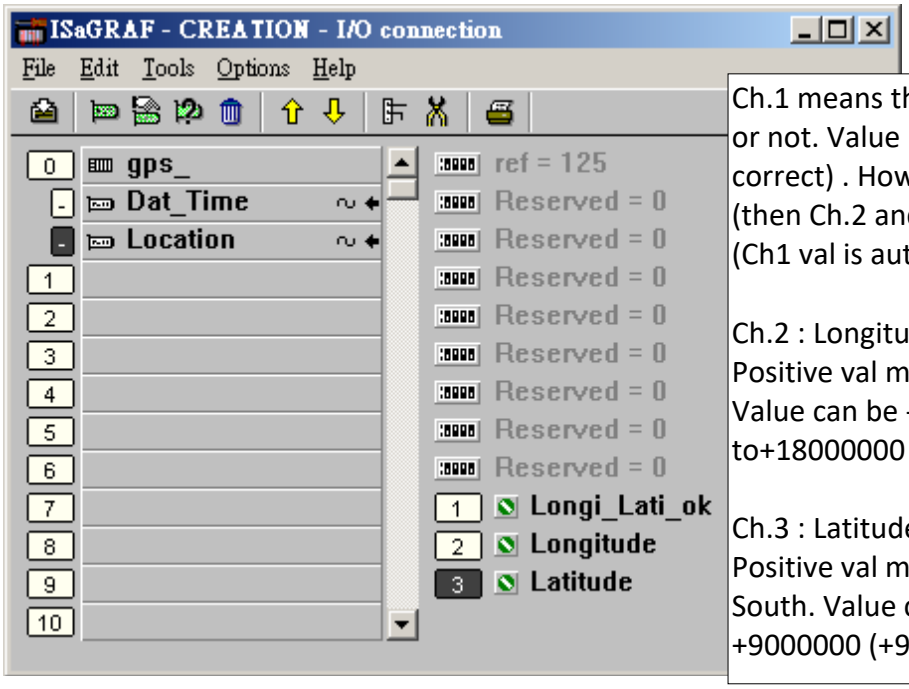




Time_Sync: value 1 means enable the auto-time-synchronization function. Value 0 disable it.
UTC_diffirence: The time difference between the UTC Time and local time. Value can be -1200 to +1200 , for ex., 800 means +8 hour, +230 means +2 hour and 30 minutes, -700 means -7 hour.

Ch.1 means the Date / Time from satellite is correct or not. Value 1 means correct (Ch.2 to 9 are all correct). However value 0 means incorrect (then Ch.2 to 9 data can not be used). (Ch1 val is auto-modified by the satellite state)
Ch.2 : Year , Ch.3 : Month , Ch.4 : Day
Ch.5 : Hour , Ch.6 : Minute , Ch.7 : Second
Ch.8 : Satellite amount found, can be 0 to 8
Ch.9 : Reserved (GPS working state, normally is 1)

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Ch.1 means the Longitude and Latitude correct or not. Value 1 means correct (Ch.2 and 3 are correct) . However value 0 means incorrect (then Ch.2 and 3 data can not be used)
(Ch1 val is auto-modified by the satellite state)

Ch.2 : Longitude, unit is 0.00001 degree. Positive val means East , negative means West. Value can be -17999999 (-179.99999 degree) to+18000000 (+180.00000 degree)

Ch.3 : Latitude, unit is 0.00001 degree. Positive val means North, negative means South. Value can be -9000000 (-90.00000) to +9000000 (+90.00000 degree)

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