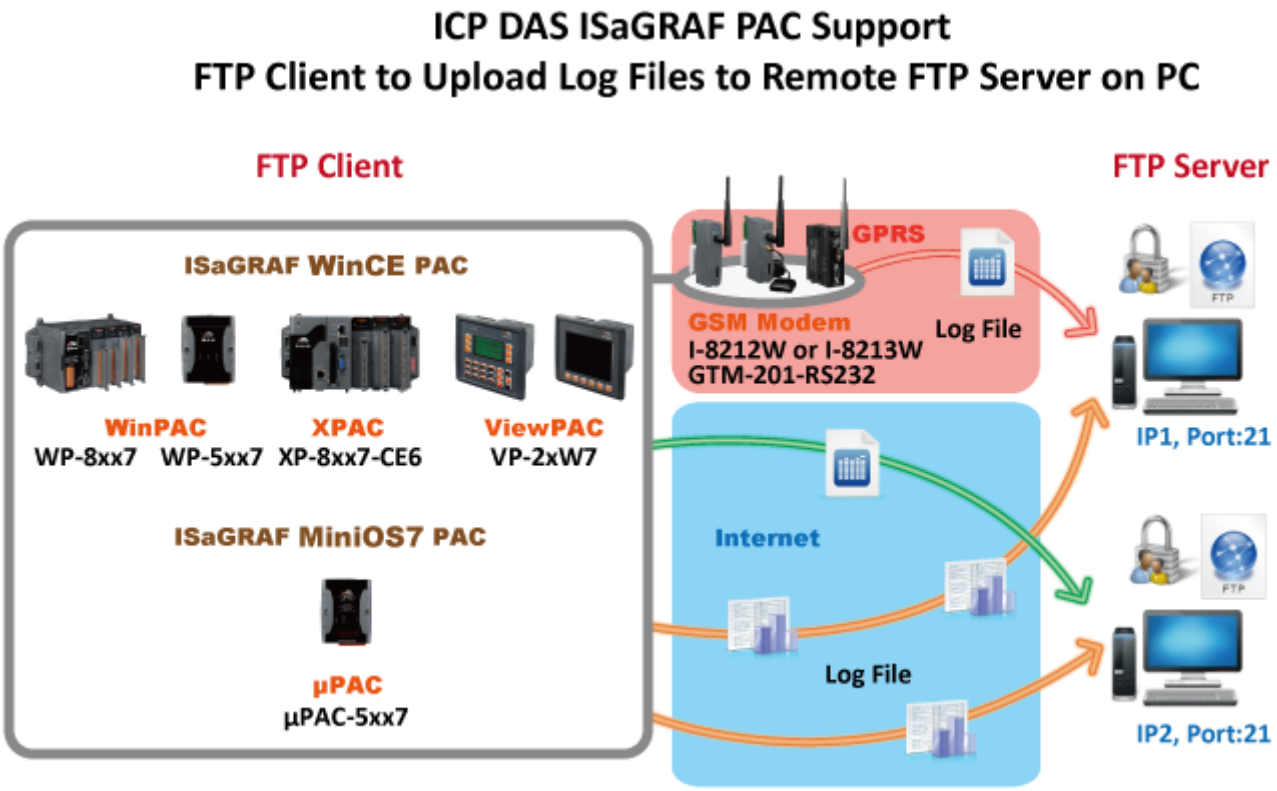
How to use FTP Client to upload log files to remote FTP Server on PC ?



● Application Description

ICP DAS's ISaGRAF PAC support FTP Client features to upload the log file to a remote FTP Server via Ethernet. Users can send data to the same Server or multiple Servers, but it can only send one file at the same time. If you want to send multiple files, please send each file separately. In this paper, it provides two demo programs to illustrate how to implement this feature.

The following ISaGRAF driver support FTP Client features:

ISaGRAF PAC	ISaGRAF Driver Version
WinCE PAC:	
WP-8xx7/ 8xx6	1.41 or later version
WP-5xx7	1.01
VP-25W7/23W7/25W6/23W6	1.33 or later version
XP-8xx7-CE6 / XP-8xx6-CE6	1.21 or later version
MiniOS7 PAC	
uPAC-5xx7	1.01

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For GPRS application, if using the I-8212W (or I-8212W-3GWA/ I-8213W/ I-8213W-3GWA) to send file to the distant FTP Server. Please refer to https://www.icpdas.com/en/faq/index.php?kind=280#751 **> FAQ-143** to configure and access the GPRS dial-up function.

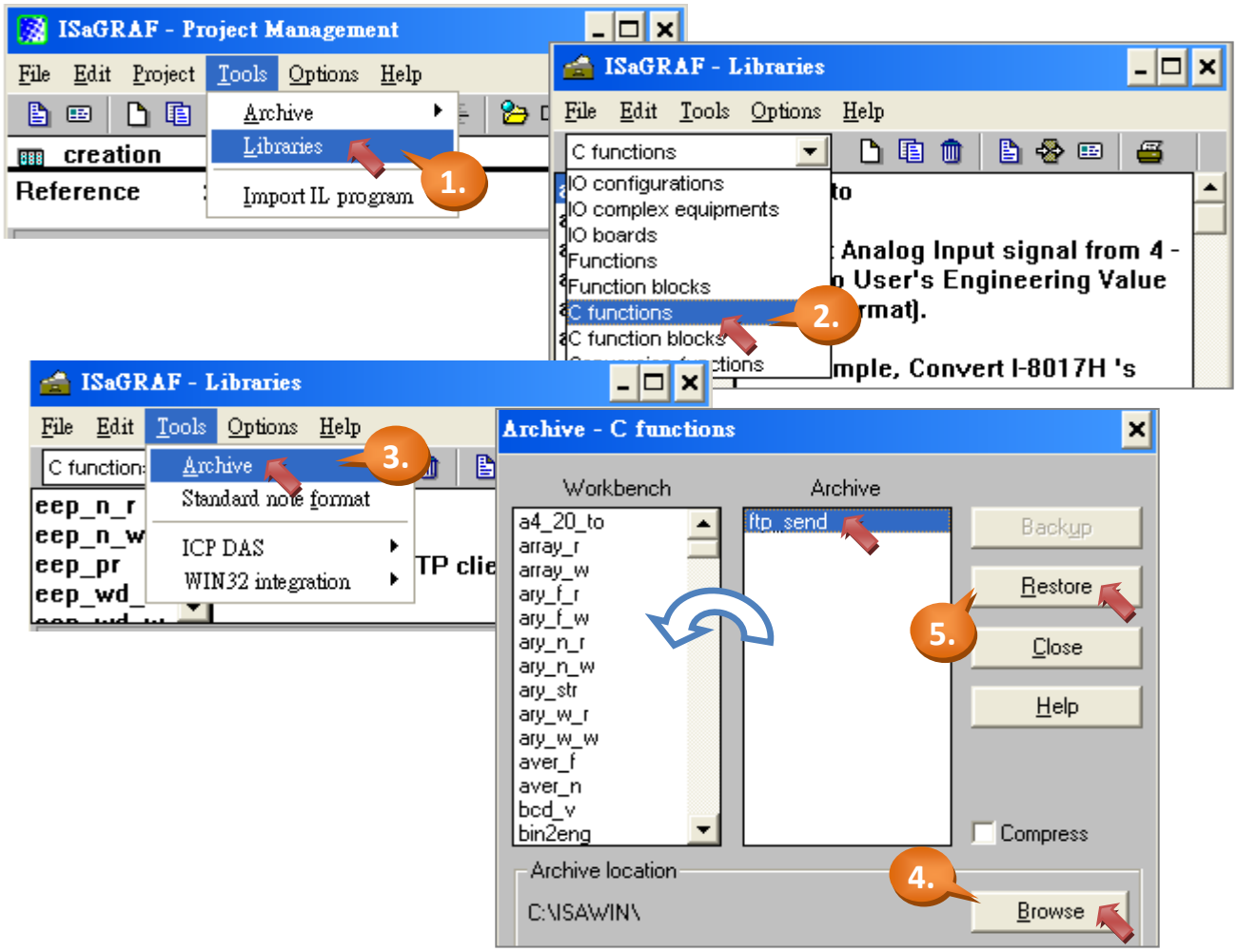
Download the ISaGRAF Driver:
If your driver version is the earlier one, please download the new ISaGRAF Driver from http://www.icpdas.com/en/download/show.php?num=368&nation=US&kind1=&model=&kw=isagraf and then follow the attached document to update the ISaGRAF PAC.

Download the ISaGRAF Demo Projects:
This paper is ISaGRAF FAQ-151. User can download the document、ISaGRAF library and demo programs from https://www.icpdas.com/en/faq/index.php?kind=280#751 **> 151**.

1.1. Restore the ISaGRAF Library and Demo Programs

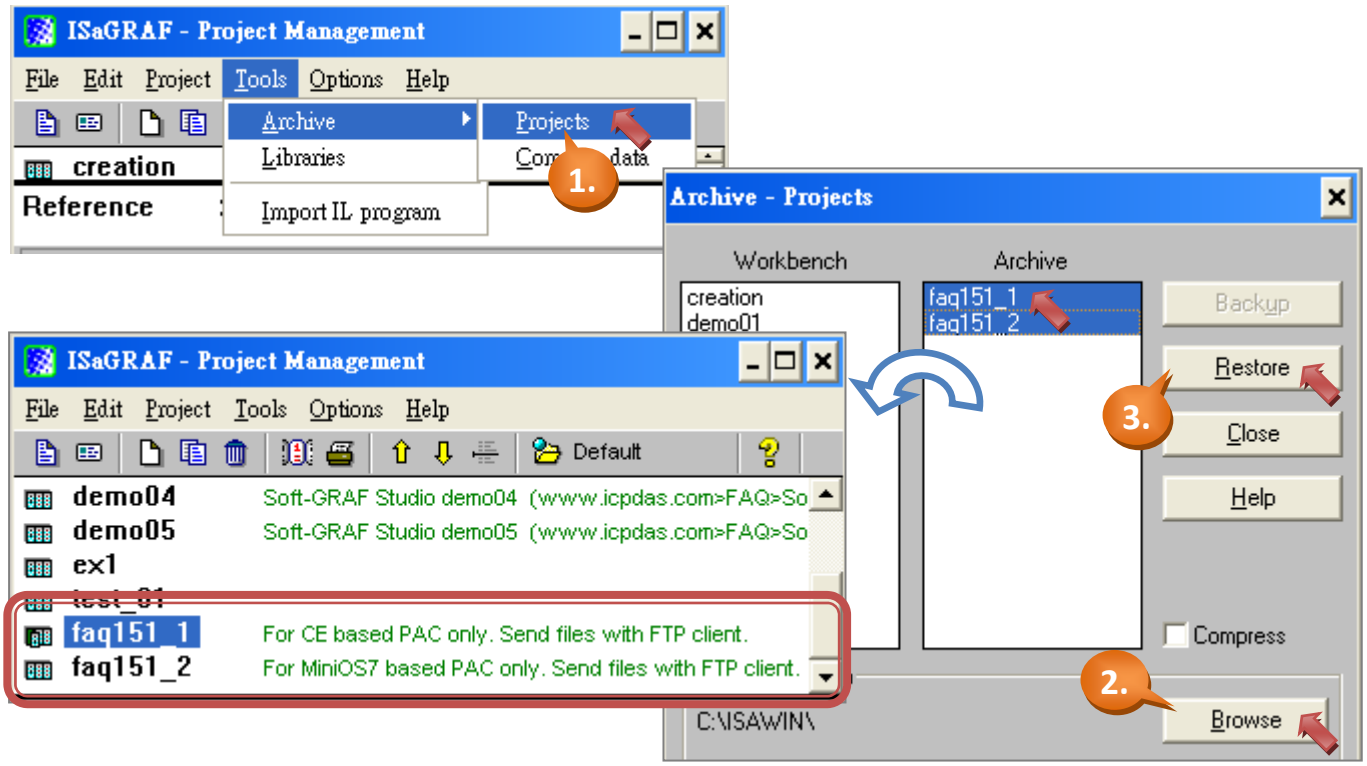
After downloading the ISaGRAF library (FTP_Send.uia) and demo programs (faq151_1.pia, faq151_2.pia), user need to restore the files to the ISaGRAF. Please follow the instructions as below:

1.1.1. Restore the ISaGRAF Library:



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1.1.2. Restore the ISaGRAF Demo Programs:



Note: The demo (faq151_1) is used for the ISaGRAF WinCE PAC. (Refer to P1)
The demo (faq151_2) is used for the ISaGRAF MiniOS7 PAC. (Refer to P1)

1.2. Instructions of ISaGRAF Library (C Functions: FTP_Send)

In Section 1.1.1, we have restored the C Function (FTP_Send.uia), the new feature - FTP_Send () added in the ISaGRAF, used to send the specified file from FTP Client to FTP Server. Users can view the instructions in the "ISaGRAF – Libraries > C Functions > ftp_send", the following are the detailed description.

Usage:

```
temp := FTP_Send ('ServerHost', ServerPort, 'UserName', 'PassWord', 'WorkingDirectory',
                  'FileName', TimeOut, reserved);
```

For instance:

```
temp := FTP_Send ('192.168.1.206', 21, 'User', '12345', '.\test', '\Email_ETH\A1.txt ', T#90s, FALSE);
```

How to Use Anonymous FTP ?

If the FTP Server support anonymous login, please use “anonymous” as user name and your e-mail address as the password. (For example: “abc@gmail.com”)

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Parameters:

Items	Type	Description
ServerHost (*)	Message	The IP address of FTP Server
ServerPort	Integer	The port number of FTP Server
UserName	Message	FTP Server Account: User name
PassWord	Message	FTP Server Account: Password
WorkingDirectory	Message	The working path of FTP Server (Max. 255 characters)
FileName (*)	Message	The file name that user wants to send
TimeOut	Timer	The interval of time out
reserved	boolean	Reserved

(*) About the “ServerHost”:

- If the FTP Server you want to connect is located on a different network segment, make sure the "gateway" IP of the controller is correct. The gateway IP can be found by『ipconfig』command in a command prompt in your PC. In addition, user can use『tracert “Server name”』command to query the Server IP (ex. C:\.....> tracert msa.hinet.net).

(*) When using the following ISaGRAF PAC, please note the usage of “FileName”:

- XP-8xx7-CE6, WP-8xx7, WP-5xx7 and VP-2xW7 : Max. 255 characters (including the path of file).
  If the file “A1.txt” stored in the '\Email_ETH\' folder, fill out “\Email_ETH\A1.txt” as the file name.
- uPAC-5xx7 : The file ID in the battery backup SRAM can be “1 ~ 8”.
  If the file (File ID : 1) stored in the built-in SRAM or S-256 / S-512, fill out “1” as the file name.

Return:

Items	Type	Description
Q_	Integer	1 : Ok, then start sending email. < 0 : Error. -1 : Busy . The FTP client is still sending. -2 : The IP address is invalid. -3 : The port number is invalid. -4 : "UserName" exceeds 64 characters. -5 : "PassWord" exceeds 64 characters. -6 : "WorkingDirectory" is invalid. -9 : The given attached file name doesn't exist or the format of file path name is invalid

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1.2.1. Detect the Status of FTP Client

Before (or after) using the “FTP_Send( )” functioin, user can also call the “R_MB_ADR(No , Addr)” function to check if the status of connection and sending is successful.

Usage: (* “TMP_v” is decalred as an Integer *)
TMP_v := R_MB_ADR(No , Addr) ;

Parameters:

No: 0 (Boolen); 1 (Integer)

Addr: 9988, to get the operation of FTP Client.
9989, to get the current progress of FTP Client (%).
9990, to get the state of FTP Client.

Note: In these demo programs, the address 9988 ~ 9990 we used is the specify address in the ISaGRAF.

Return:

When using “R_MB_ADR(1 , 9988)”: to get the operation of FTP Client.

Return	Description
0	Connecting to FTP server
1	Logging in, send user name to FTP server
2	Logging in, send password to FTP server
3	Making directory
4	Changing working directory
5	Getting current path
6	Changing data type to binary
8	Setting active mode
9	Establlishing data session
12	Putting the file to FTP Server
14	Uploading file to FTP Server
18	Quitting FTP Server

When using “R_MB_ADR(1 , 9989)”: to get the current progress of FTP Client (%).
⇨ Return value = 0 ~ 100.

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When using “R_MB_ADR(1 , 9990)”: to get the state of FTP Client.

Return	Description
0	Sleep. No action.
1	Busy. The file is still sending now.
221	The file is successfully sent.
< 0	Error happens
-530	Not logged in
-550	Permission deny
-601	Session broken
-602	Socket select error
-603	Session timeout
-604	Socket exception

For example:

```
(* “TMP_v” is decalred as an Integer, “to_send” is decalred as Boolean *)
TMP_v   :=   R_MB_ADR( 1 , 9990 ) ;

 if   TMP_v <> 1   then
    if   TMP_v = 221   then
       (*The file is successfully sent. *)

    end_if ;

    (* If "to_send" variable is triggered to become TRUE, send a file to FTP Server *)
       if   to_send   then
          to_send   :=   False ;

       (* Send a file to FTP Server *)
       TMP_v := temp := FTP_Send('192.168.1.206', 21, 'user', '1111', '.\test', '1', T#90s, FALSE);
       end_if ;
 end_if ;
```


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1.3. Setup the FTP Server and Test the Demo Program

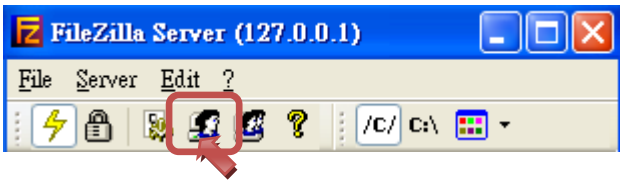
In Section 1.1.2, we have restored two demo programs - faq151_1.pia (used for ISaGRAF WinCE PAC), faq151_2.pia (used for ISaGRAF MiniOS7 PAC). This Section will show you how to upload the log file from the ISaGRAF PAC to FTP Server. Before doing this, make sure you have setup the FTP Server.

1.3.1. Setup the FTP Server

In this example, we will install the free FTP software - "FileZilla Server". The following are the description of setting.

Create a User Account:

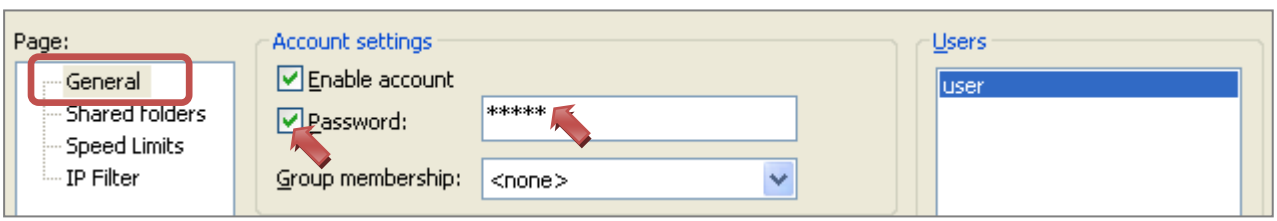
⇨ Click the below icon to set user account.



⇨ Click "Add" button to add user account and fill out the user name.



⇨ Checked the "Password" option and fill out the password.



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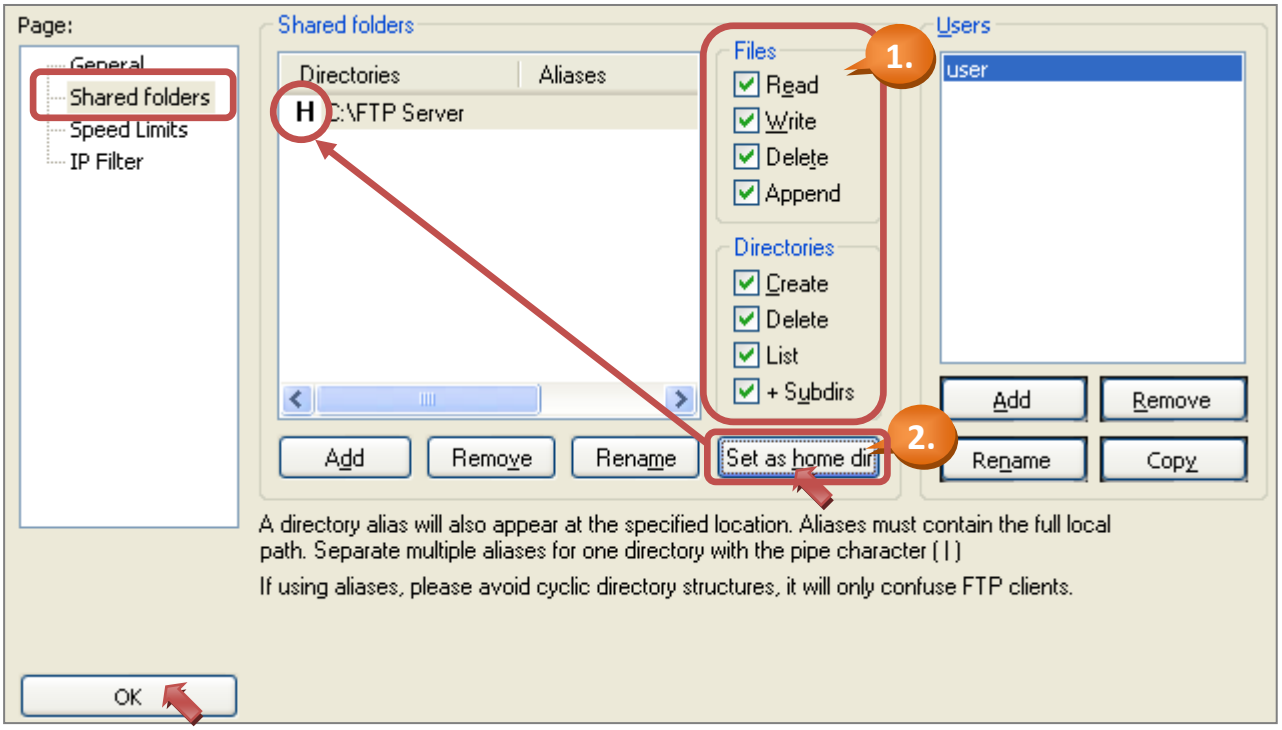
Create a shared folder:

⇨ Change to the “Shared folders” page.
⇨ Click “Add” button and designate a shared folder (ex. C:\FTP Server).



Setup the root directory/file authorization:

⇨ Select all of the authorization options and click “Set as home dir” to set the root directory then click “ok”.



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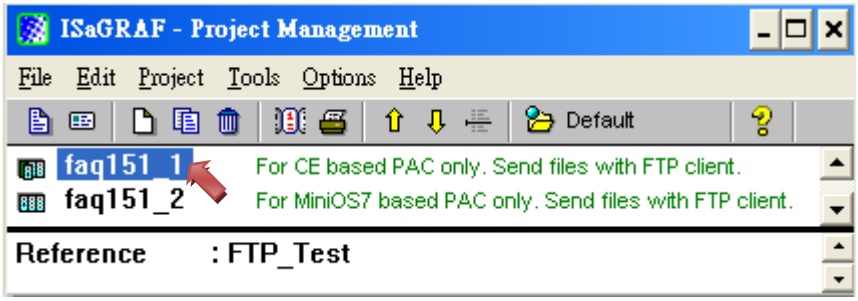
1.3.2. Test the Demo Program

In the previous section, we have setup the FTP Server. Now, we will take the “faq151_1” as an example to illustrate the operation of demo program.
(Go to Section 1.4 to get a detailed description of the demo programs).

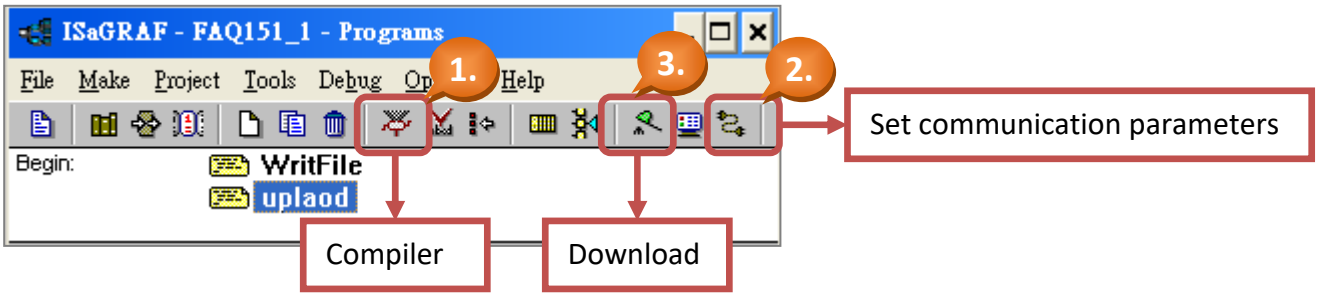
Download the demo program (faq151_1):

Note: The demo program “faq151_1” is uesd for ISaGRAF WinCE PAC. (Refer to P1)

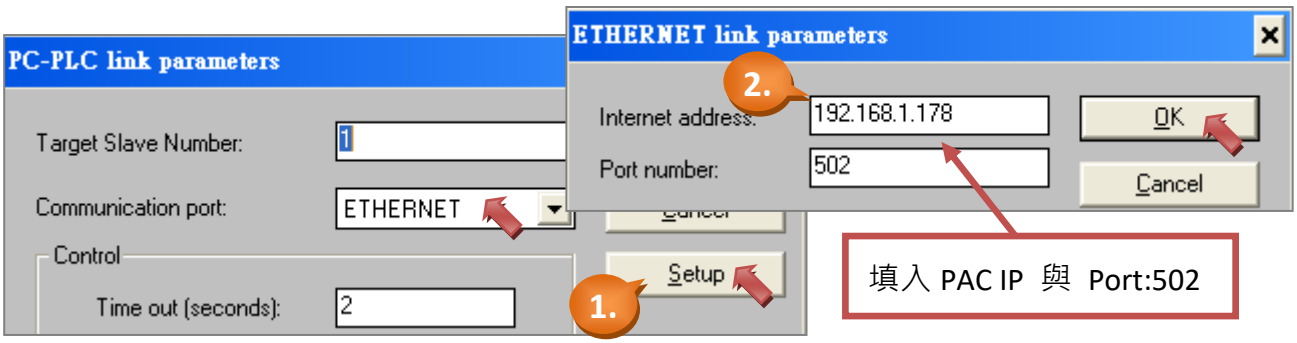
⇨ Double-click the “faq151_1” to open the program.



⇨ Click “1” button (as the figure below) to compile the program.



⇨ Click “2” button (as the figure above) to set communication parameters.



⇨ Click “3” button (as the figure above) to download the program to the ISaGRAF PAC.

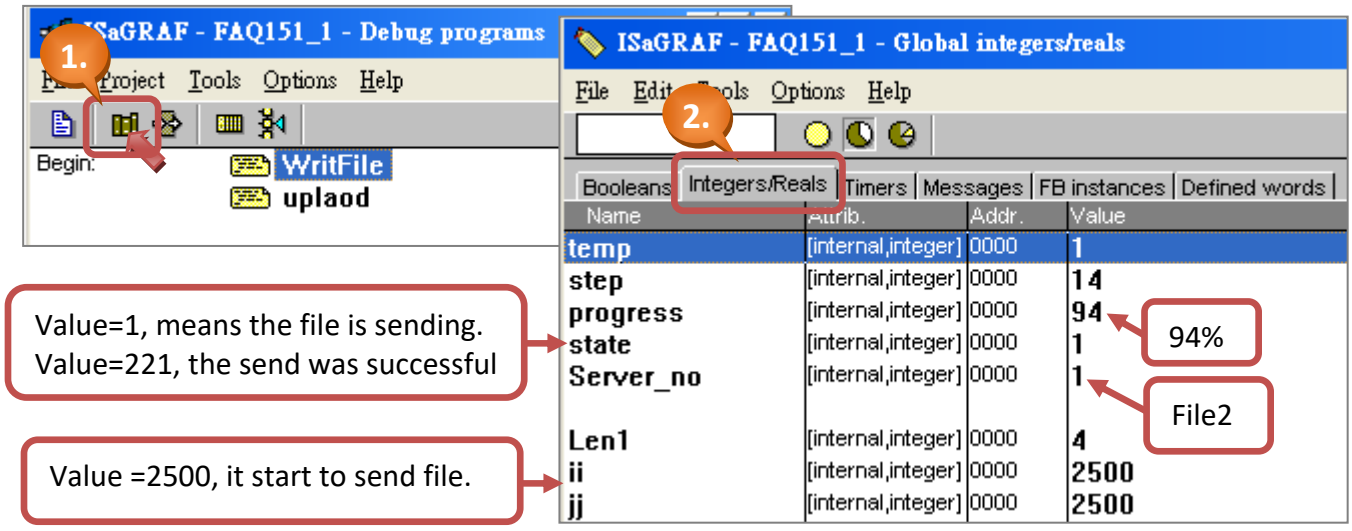
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After successful downloading, it will show up this window.

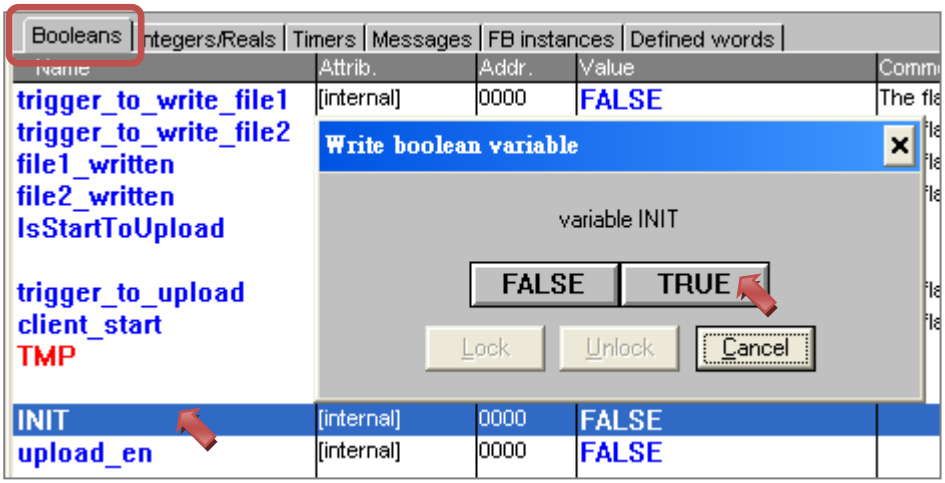


Operation of demo program:

⇨ In the “Debug programs” window, click “Dictionary” button to open the ISaGRAF variables window.
⇨ User can see the status of the file transfer under the “Intergers/Reals” tab.
In this example, when the PAC receives 2500 data (variables - ii, jj) and write it to a text file, it will start sending the file 1 (Server_no=0) and file 2 (Server_no=1) to FTP Server.



⇨ In the “Booleans” tab, user can set the variable “INIT” as “TRUE” to run the program again.



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⇨ In Section 1.3.1 , we have set the root directory of FTP Server as “C:\FTP Server”. Now, you can check if the files have stored in the directory.

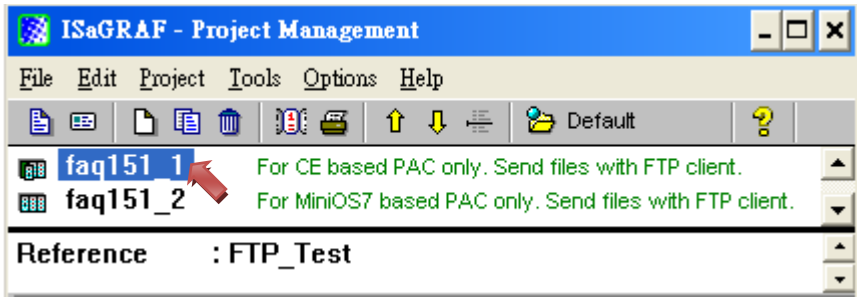


1.4. Description of Demo Programs

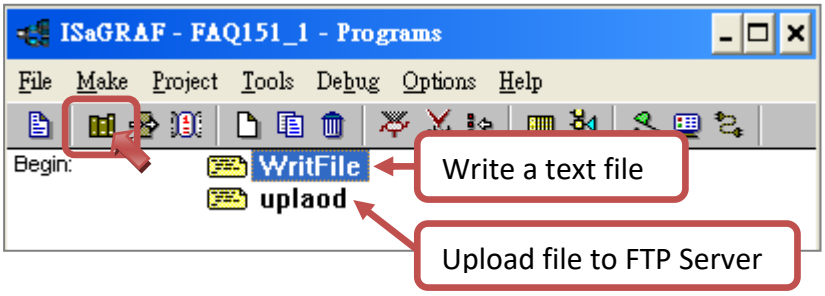
In this paper, we provide two demo programs - faq151_1 (used for ISaGRAF WinCE PAC) and faq151_2 (used for ISaGRAF MiniOS7 PAC), the content of them are similar but the difference is the log file in the ISaGRAF MiniOS7 PAC is stored in the battery backup SRAM and using ID number to represent its location.

1.4.1. Demo 1 - faq151_1 (used for ISaGRAF WinCE PAC):

⇨ Double-click the “faq151_1” to open the program.



⇨ This demo includes two ST programs (“WritFile”, “upload”).
⇨ First, click “Dictionary” button to see the variables which in use.



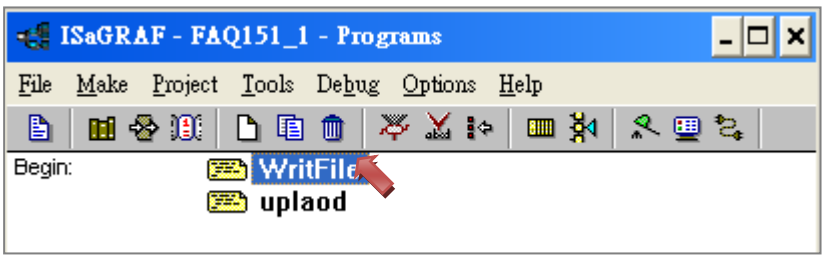
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ISaGRAF Variables:

Name	Type	Description
trigger_to_write_file1	Boolean	Start receiving data and write it to file 1 when set as True.
trigger_to_write_file2	Boolean	Start receiving data and write it to file 2 when set as True.
file1_written	Boolean	File 1 is ready to be sent when set as True.
file2_written	Boolean	File 2 is ready to be sent when set as True.
trigger_to_upload	Boolean	Start uploading files when set as True.
client_start	Boolean	The Client is starting to upload files when set as True.
TMP	Boolean	Temporary used Boolean.
INIT	Boolean	**Must declare an initial value "True".**
upload_en	Boolean	Logical control for uploading each file to FTP Server.
temp	Integer	Temporary used Integer. (Set initial value as 0)
step	Integer	The operation of FTP Client. (Set initial value as 0)
progress	Integer	The progress of uploading file to FTP server. (Set initial value as 0)
state	Integer	The current status of FTP Client. (Set initial value as 0)
Server_no	Integer	Select which Server and file to upload. (Set initial value as 0)
Len1	Integer	Temporary used Integer. (Set initial value as 0)
ii	Integer	The number of receiving data. (Set initial value as 0)
jj	Integer	The number of receiving data. (Set initial value as 0)
kk	Integer	Temporary used Integer. (Set initial value as 0)
step1	Integer	Temporary used Integer. (Set initial value as 0)
File_id1	Integer	The path and file name of "File 1".
File_id2	Integer	The path and file name of "File 2".
TMP_msg1	Message	Max. Len =255
TMP_msg	Message	Max. Len =255

Faq151_1 - WritFile:

⇨ The program is used to write the received data into a text file. Please double-click "WritFile" to open the window.



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```
if INIT then

    (* Initialize variables *)
    ii := 0;
    jj := 0;
    TMP_msg := 'The file sent via FTP by the WinCE based PAC.$0D$0A' ;

    (* Create a file *)
    File_id1 := F_Creat('\Email_ETH\A1.txt') ;

      (* Check if the file is created *)
      if File_id1 <> 0 then
            trigger_to_write_file1 := true;
      end_if;

    (* Create a file *)
    File_id2 := F_Creat('\Email_ETH\A2.txt') ;

      (* Check if the file is created *)
      if File_id2 <> 0 then
            trigger_to_write_file2 := true;
      end_if;

      INIT := false;
end_if;

(* Ready to write information to file 1 *)
if trigger_to_write_file1 then

      if ii < 2500 then
            Len1 := MLEN( MSG(ii + 1) ) ;
            TMP_msg1 := '';

            for kk := 0 to (4 - Len1) do
                  TMP_msg1 := TMP_msg1 + ' ';
            end_for;

            TMP_msg1 := TMP_msg1 + MSG(ii+1) + ' : ' + TMP_msg;
            TMP := F_WRIT_S( File_id1 , TMP_msg1 ) ;

            ii := ii + 1;
```

Create a file with the name and location (\Email_ETH\A1.txt)

Create a file with the name and location (\Email_ETH\A2.txt)

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```
        else
                (* All information is writted to file 1 *)
                TMP := F_Close(File_id1);
                file1_written := true;
                trigger_to_write_file1 := false;
        end_if;
end_if;

(* Ready to write information to file 2 *)
if trigger_to_write_file2 then

        if jj < 2500 then

                Len1 := MLEN( MSG(jj + 1) ) ;
                TMP_msg1 := '';

                for kk := 0 to (4 - Len1) do
                        TMP_msg1 := TMP_msg1 + ' ';
                end_for;

                TMP_msg1 := TMP_msg1 + MSG(jj + 1) + ' : ' + TMP_msg;
                TMP := F_WRIT_S( File_id2 , TMP_msg1 ) ;

                jj := jj + 1;
        else
                (* All information is writted to file 2 *)
                TMP := F_Close(File_id2);
                file2_written := true;
                trigger_to_write_file2 := false;
        end_if;
end_if;
```

Faq151_1 - upload:

⇨ The program is used to upload the log file to FTP Server. Please double-click “upload” to open the window.



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```
(* If all information is written in file 1 and file 2, trigger to sned file via FTP *)
if file1_written and file2_written then

        upload_en := true;
        step1 := 0;
        file1_written := false;
        file2_written := false;

end_if;

(* Logic control to send files to FTP server separately *)
if upload_en then

        case step1 of
                0:
                        (* Send file1 to FTP Server *)
                        Server_no := 0;
                        step1 := step1 + 1;
                        trigger_to_upload := true;
                1:
                        (* Send file 2 to FTP Server, when sending file 1 via FTP is finished *)
                        if progress = 100 then
                                Server_no := 1;
                                step1 := step1 + 1;
                                trigger_to_upload := true;
                        end_if;
                2:
                        (* Uploading process is finished *)
                        if progress = 100 then
                                upload_en := false;
                        end_if;
        end_case;
end_if;


if trigger_to_upload then

   case Server_no of
        0:
           temp := FTP_Send('192.168.1.236', 21, 'grady', 'fiona0508', '.\ftp_test\test\test',
                            '\Email_ETH\A1.txt', T#90s, FALSE);
```

Uploading the file (ISaGRAF PAC: \Email_ETH\A1.txt) to FTP Server
IP: 192.168.1.236, Port: 21,
User Name: grady, Password: fiona0508,
File Path: under the root directory '.\ftp_test\test\test'.
(It will auto create a new directory if it doesn't exist)

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Uploading the file (ISaGRAF PAC: \Email_ETH\A2.txt) to FTP Server
IP: 192.168.1.236, Port: 21,
User Name: grady, Password: fiona0508,
File Path: under the root directory '.\ftp_test\test\test'.
(It will auto create a new directory if it doesn't exist)

```
        1:
            temp := FTP_Send('192.168.1.236', 21, 'grady', 'fiona0508', '.\ftp_test\test\test',
                             '\Email_ETH\A2.txt', T#90s, FALSE);
        end_case;

        trigger_to_upload := false;
        client_start := true;
end_if;


(* Moniter the state of FTP Client *)
if client_start then

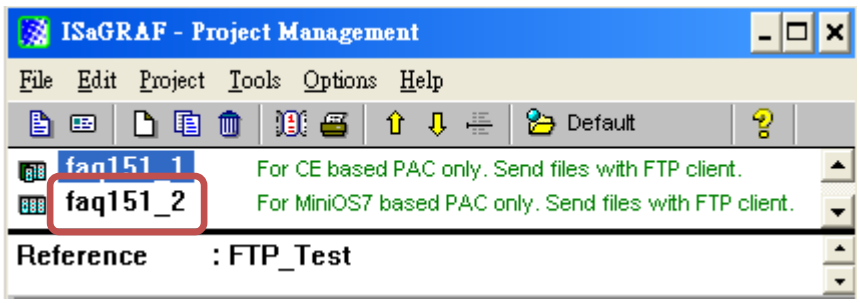
        state := r_mb_adr(1, 9990);
        step := r_mb_adr(1, 9988);
        progress := r_mb_adr(1, 9989);

        (* When the variable is 221, it shows the uploading is finished *)
        if state = 221 then
                client_start := false;
        end_if;
end_if;
```

Refer to "Section 1.2.1 Detect the Status of FTP Client" to get more information.

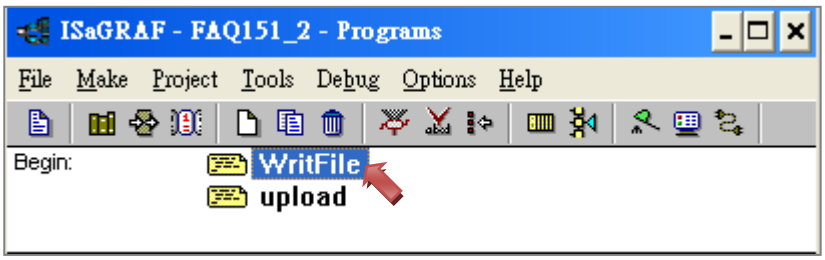
1.4.2. Demo 2 - faq151_2 (used for ISaGRAF MiniOS7 PAC):

⇨ Double-click the "faq151_2" to open the program.



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⇨ This demo includes two ST programs (“WritFile”, “upload”).



ISaGRAF Variables:

⇨ Due to the “FAQ151_2” and “FAQ151_1” using the similar variables, refer to Section 1.4.1 to get more information.

Faq151_2 - WritFile:

⇨ The program is used to write the received data into a text file.
⇨ Double-click “WritFile” (as figure above) to open the window.

```
if INIT then

    (* Initialize variables *)
    ii := 0;
    jj := 0;
    file1_size := 0;
    file2_size := 0;
    TMP_msg := 'Attached file sent with an email by the uPAC-7186EG or iPAC-8477/8877.$0D$0A' ;

        (* Create a file *)
        TMP := S_FL_ini( 1 , 'A1.txt' , 1 , 200000 ) ;

        if TMP then
                trigger_to_write_file1 := true;
        end_if;

        TMP := S_FL_ini( 2 , 'A2.txt' , 200001 , 400000 ) ;

        if TMP then
                trigger_to_write_file2 := true;
        end_if;

        INIT := false;

end_if;
```

File ID: ‘1’, File name: 'A1.txt', Storage address: 1 ~ 200000

File ID: ‘2’, File name: 'A2.txt', Storage address: 200001 ~ 400000

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```
(* Ready to write information to file 1 *)
if trigger_to_write_file1 then

        if ii < 2500 then

                Len1 := MLEN( MSG(ii+1) ) ;
                TMP_msg1 := '';

                for kk := 0 to (4 - Len1) do
                        TMP_msg1 := TMP_msg1 + ' ';
                end_for;

                TMP_msg1 := TMP_msg1 + MSG(ii+1) + ' : ' + TMP_msg;
                Len1 := MLEN( TMP_msg1 ) ;
                TMP := S_m_w( 1+ file1_size , Len1 , TMP_msg1 ) ;
                file1_size := file1_size + Len1;
                ii := ii + 1;
        else

                TMP := S_FL_AVL( 1 , 1 , file1_size ) ;
                file1_written := true;
                trigger_to_write_file1 := false;
        end_if;
end_if;

(* Ready to write information to file 2 *)
if trigger_to_write_file2 then

        if jj < 2500 then
                Len1 := MLEN( MSG(jj + 1) ) ;
                TMP_msg1 := '';

                for kk := 0 to (4 - Len1) do
                        TMP_msg1 := TMP_msg1 + ' ';
                end_for;

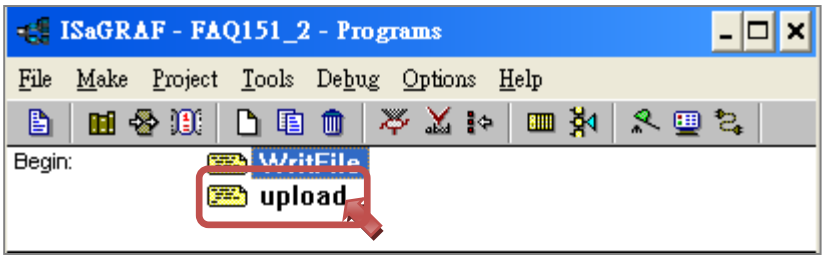
                TMP_msg1 := TMP_msg1 + MSG(jj+1) + ' : ' + TMP_msg;
                Len1 := MLEN( TMP_msg1 ) ;
                TMP := S_m_w( 200001 + file2_size , Len1 , TMP_msg1 ) ;
                file2_size := file2_size + Len1;
                jj := jj + 1;
```


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```
        else
                TMP := S_FL_AVL( 2 , 200001 ,    200000 + file2_size ) ;
                file2_written := true;
                trigger_to_write_file2 := false;
        end_if;
end_if;
```

Faq151_2 - upload:

⇨ The program is used to upload the log file to FTP Server.
⇨ Double-click “upload” to open the window.




```
(* If all information is written in file 1 and file 2, trigger to sned file via FTP *)
if file1_written and file2_written then

        upload_en := true;
        step1 := 0;
        file1_written := false;
        file2_written := false;
end_if;

(* Logic control to send files to FTP server separately *)
if upload_en then

        case step1 of
                0:
                        (* Send file1 to FTP Server *)
                        Server_no := 0;
                        step1 := step1 + 1;
                        trigger_to_upload := true;
```


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```
                1:
                        (* Send file 2 to FTP Server, when sending file 1 via FTP is finished *)
                        if progress = 100 then
                                Server_no := 1;
                                step1 := step1 + 1;
                                trigger_to_upload := true;
                        end_if;
                2:
                        (* Uploading process is finished *)
                        if progress = 100 then
                                upload_en := false;
                        end_if;
        end_case;
end_if;


if trigger_to_upload then

        case Server_no of
                0:
                 temp := FTP_Send('192.168.1.236', 21, 'grady', 'fiona0508', '.\ftp_test\test\test',
                                  '1', T#90s, FALSE);
                1:
                 temp := FTP_Send('192.168.1.236', 21, 'grady', 'fiona0508', '.\ftp_test\test\test',
                                  '2', T#90s, FALSE);
        end_case;

        trigger_to_upload := false;
        client_start := true;
end_if;

(* 偵測 FTP Client 的狀態 *)
if client_start then

        state := r_mb_adr(1, 9990);
        step := r_mb_adr(1, 9988);
        progress := r_mb_adr(1, 9989);

        if state = 221 then
                client_start := false;
        end_if;
end_if;
```

Uploading the file (File ID: 1) to FTP Server.
IP: 192.168.1.236, Port: 21,
User Name: grady, Password: fiona0508,
File Path: under the root directory '.\ftp_test\test\test'.
(It will auto create a new directory if it doesn't exist)

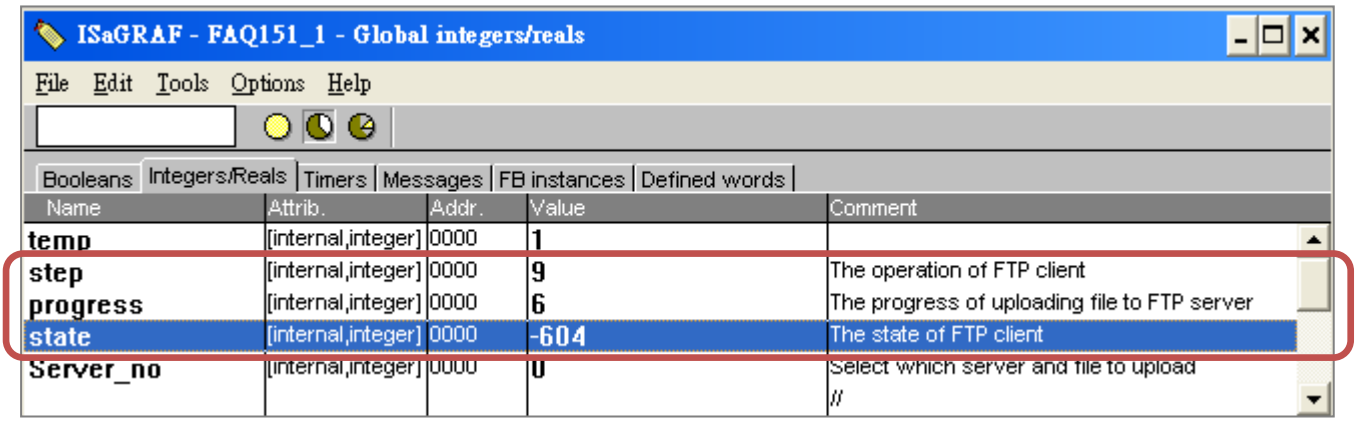
Uploading the file (File ID: 2) to FTP Server.
(The parameters are the same with above)

Refer to "Section 1.2.1 Detect the Status of FTP Client" to get more information.

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1.5. About the Firewall Setting

When users download a demo program (faq151_1 or faq151_2) to the controller, if the ISaGRAF variables window shows as below, indicating that the connection between Client and Server is invalid. At this time, you need to modify the firewall setting.



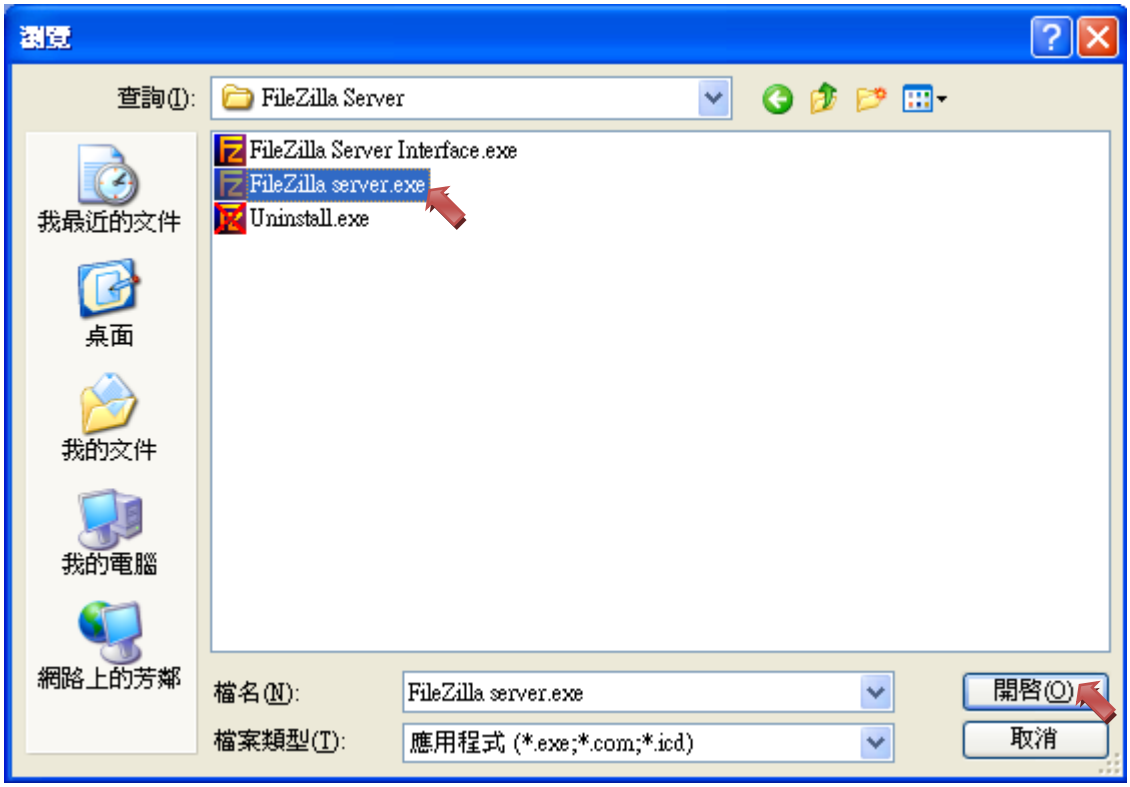
⇨ Go to Windows『Start』>『Control Panel』> Open『Windows Firewall』.

⇨ Click “Add Program” button under the “Exceptions” tab then click “Browse” button.

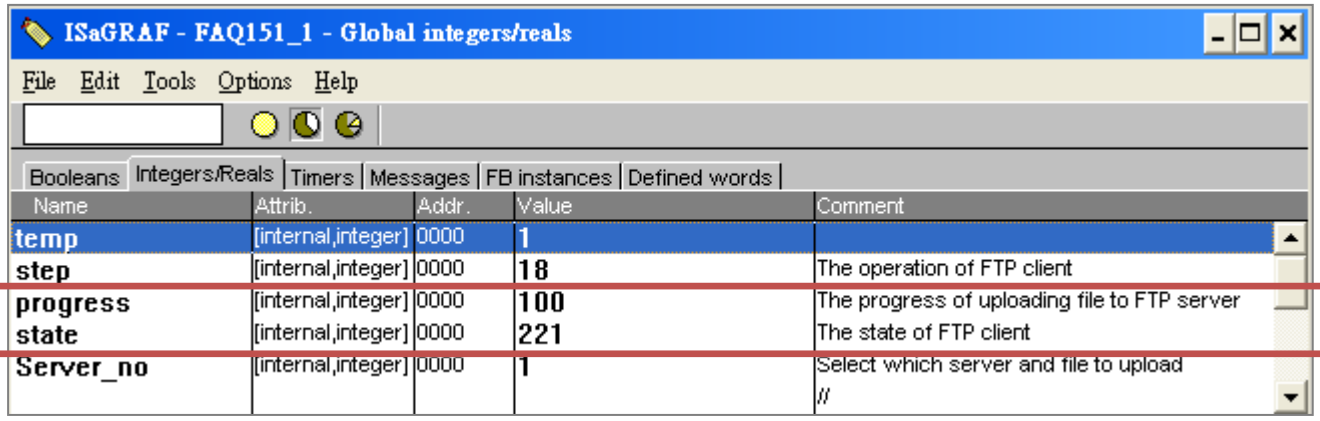


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⇨ In Section 1.3.1, we use the free FTP software (FileZilla Server) and the installation path is "C:\Program Files\FileZilla Server", please add the "**FileZilla server.exe**" file to the exception list.



⇨ After completing the setting, please go back to Section 1.3.2 Test the Demo Program. Switch to "Boolean" tab in the ISaGRAF variables window, and set the variable "INIT" as "TRUE" to try it again. If the following screen appears, indicating that the files upload was successfully.



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