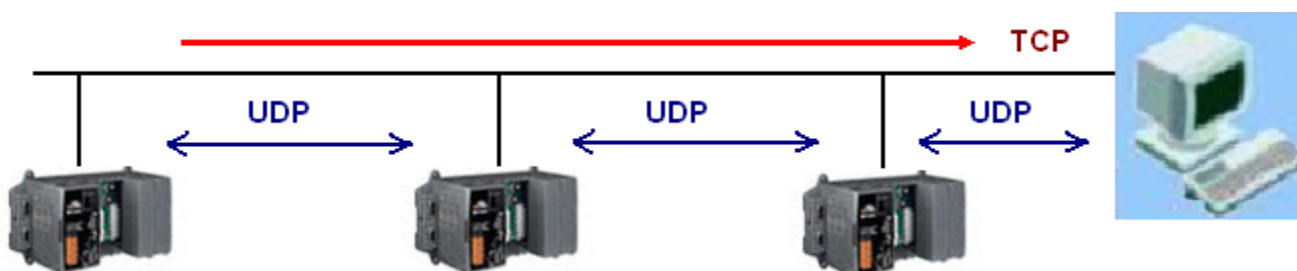


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How to deliver event data by ISaGRAF PAC ?

This paper list the way to deliver event data via UDP by ISaGRAF PAC to remote stations.

There are some applications which require to deliver event data one by one in sequence to one or some remote PC or PAC. The ISaGRAF PAC support "UDP_send" and "UDP_rcv" which is very useful for such applications. If an application require more safety than the UDP mechanism, some ISaGRAF PAC support "TCP_send" and "TCP_rcv" are suitable to deliver event data to a remote PC.



The following PAC support "IO connection > UDP" to use "UDP_send" and "UDP_rcv" to deliver UDP data between PACs (or between PAC and PC).

WP-8xx7 / 8xx6 , VP-25W7 / 25W6 , VP-4137 / 4136 , VP-23W7 / 23W6 , WP-5147 / 5146 ,
 XP-8xx7-CE6 , XP-8xx6-CE6 , XP-8xx7-ATOM-CE6 , XP-8xx6-ATOM-CE6 ,
 i-8437-80 , i-8837-80 , iP-8447 / 8847 , I-7188EG , uP-7186EG

The following PAC support "IO connection > TCP_CLIE" to use "TCP_send" and "TCP_rcv" to deliver TCP data between PAC and PC.

WP-8xx7 / 8xx6 , VP-25W7 / 25W6 , VP-4137 / 4136 , VP-23W7 / 23W6 , WP-5147 / 5146 ,
 XP-8xx7-CE6 , XP-8xx6-CE6 , XP-8xx7-ATOM-CE6 , XP-8xx6-ATOM-CE6

Please download this dicument and its demo programs at the following web site.

<https://www.icpdas.com/en/faq/index.php?kind=280#751> > FAQ-162 .

The section 1.1 lists the way to deliver event data via UDP between two PAC.

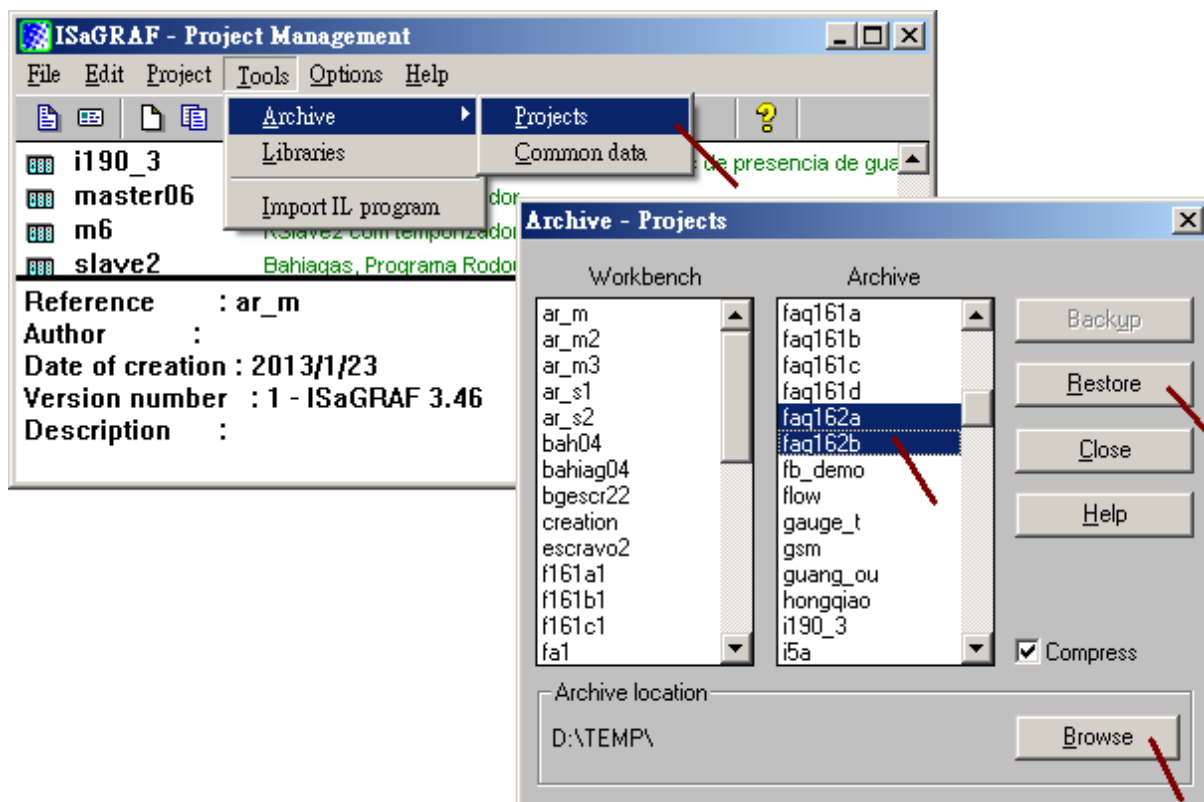
If user want to know about deliving event data between PAC and PC, please refer to section 1.2 and 1.3 of this paper. Or refer to <https://www.icpdas.com/en/faq/index.php?kind=280#751> > FAQ-065 and chapter 19.2 and 19.3 of the "ISaGRAF User's Manual" at

(<http://www.icpdas.com/en/download/show.php?num=333&nation=US&kind1=&model=&kw=isagraf>).

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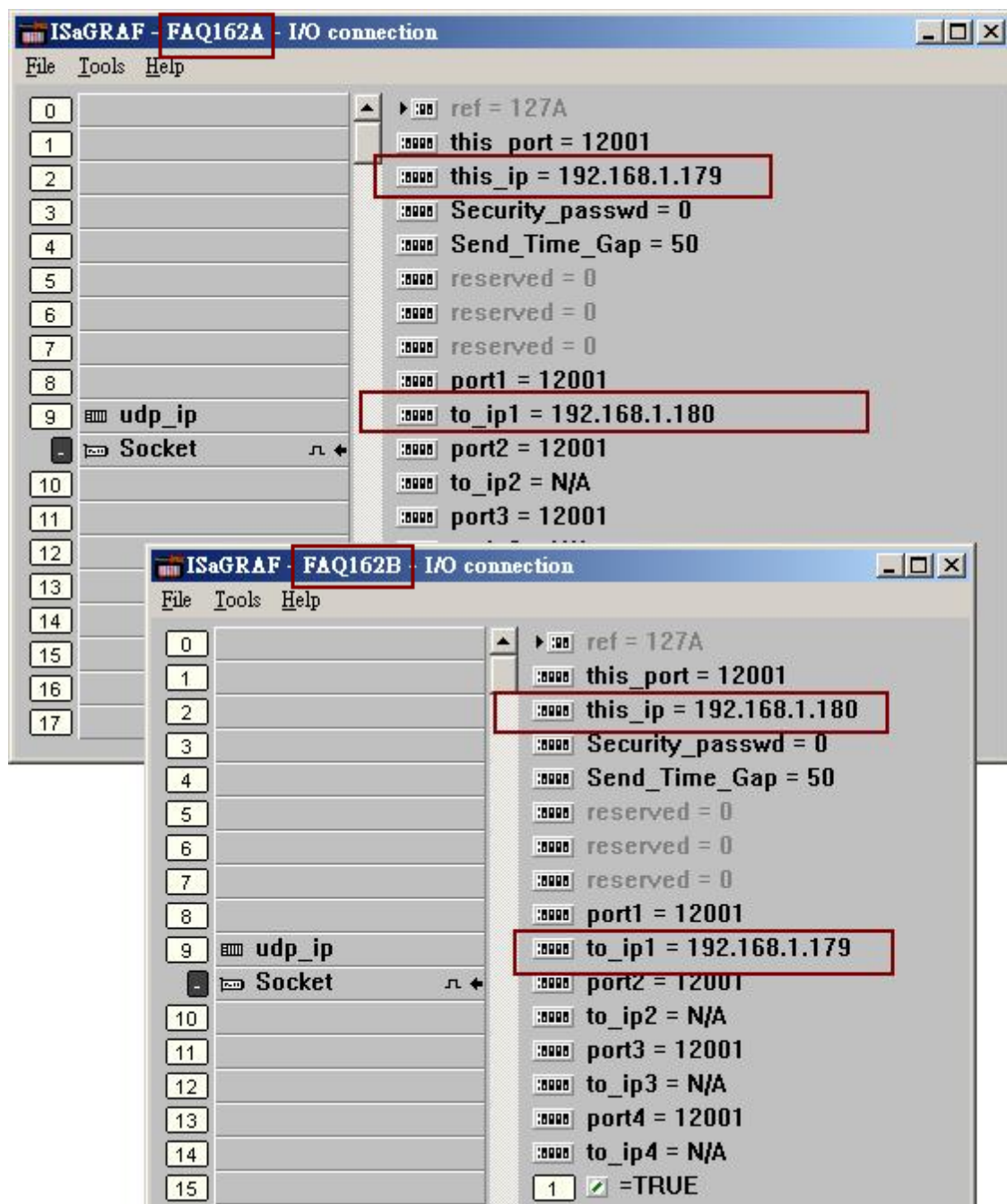
1.1 Install the UDP example project and test it

There are three demo programs “faq162a.pia”, “faq162b.pia” and “faq162c.pia” in the “faq162_demo_chinese.zip” (download it from <https://www.icpdas.com/en/faq/index.php?kind=280#751> > FAQ-162). Please restore them to your PC / ISaGRAF .



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The "FAQ162A" is for the PAC with IP address "192.168.1.179" (named as "Station A").
The "FAQ162B" is for the PAC with IP address "192.168.1.180" (named as "Station B").
Both enable "UDP" in the IO connection to communicate with each other.
("FAQ162C" enables PAC as TCP client to deliver TCP data to a PC, refer to the section 1.3).



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When download the “FAQ162A” and “FAQ162B” to these two PAC successfully (192.168.1.179 and 192.168.1.180), the below ISaGRAF debugger windows on PAC will show up . Then you can try to test them by modify some value to trigger an event. For example, change the value of “Long_05” or “Long_08” (left hand side), it will trigger an event in the FAQ162A and then deliver event data to FAQ162B (right hand side) . You can see the “COMING” signal (a Boolean variable) on the right hand side blinking about 10 seconds which means it has received events.

The screenshot displays two ISaGRAF debugger windows side-by-side, both titled "ISaGRAF - FAQ162A - Debugger" and "ISaGRAF - FAQ162B - Debugger". Each window shows a "List of variables" table.

FAQ162A - List of variables:

Name	Value	Comment
COMING	FALSE	when blinked means there is at least one rem
Last_Event_No	3	Last Event No. from remote station
REAL_01	0	REAL val from remote, addr=101,103, ..
REAL_02	0	
REAL_03	3.3333	
REAL_04	0	
REAL_05	0	
Long_01	0	long integer value 1 ~ 10, addr are 1, 3, ...
Long_02	0	Trigger an event by changing the Long_01 ~ 1
Long_03	0	then the event data will be sent to remote stat
Long_04	0	
Long_05	5	
Long_06	0	
Long_07	777	
Long_08	888	
Long_09	0	
Long_10	0	

FAQ162B - List of variables:

Name	Value
COMING	FALSE
Last_Event_No	5
Long_01	0
Long_02	0
Long_03	0
Long_04	0
Long_05	5
Long_06	0
Long_07	777
Long_08	888
Long_09	0
Long_10	0
REAL_01	0
REAL_02	0
REAL_03	3.3333
REAL_04	0
REAL_05	0

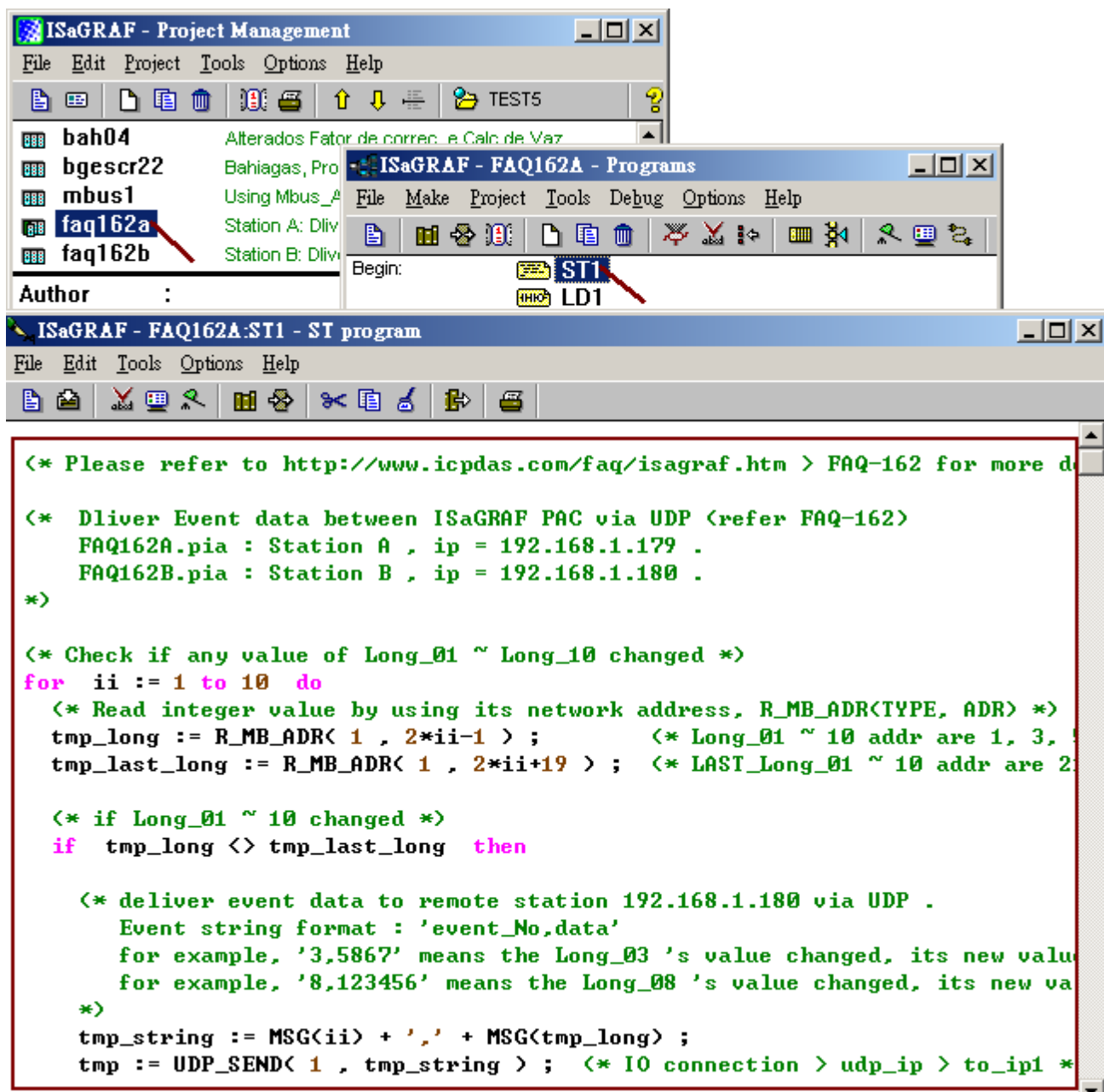
Annotations in the image:

- A red box highlights "Long_05" in the FAQ162A list. A blue arrow points from it to the text: "Change value here Will send event to station B."
- A red box highlights "Long_08" in the FAQ162B list. A blue arrow points from it to the text: "Change value here Will send event to Station A"

At the bottom, a status bar shows: "17:35:20 IOL: application stopped"

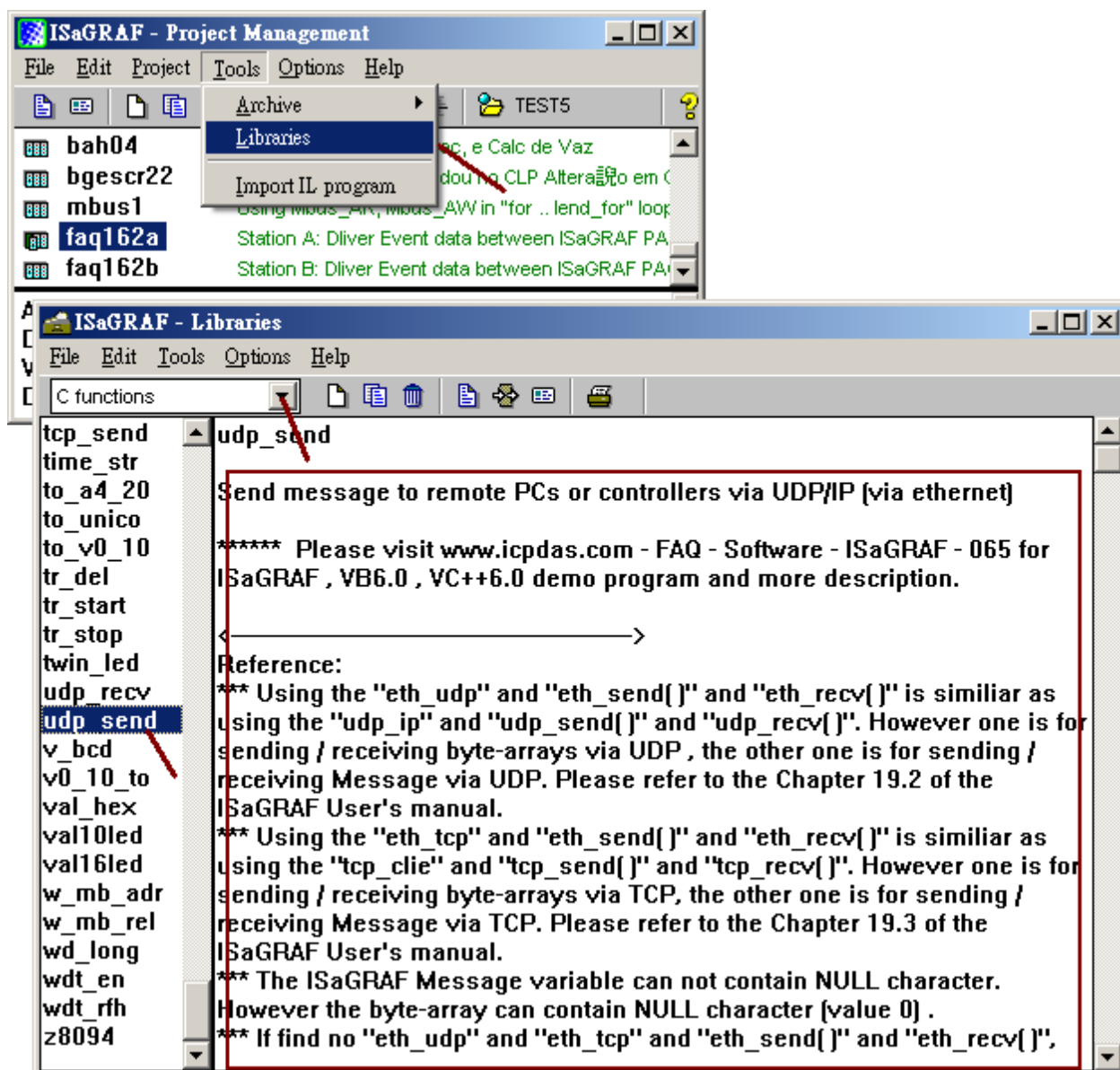
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Please open the PC / ISaGRAF > FAQ162A and FAQ162B to know more about thier program.



The next page show you how to get description of c-functions which are used in these two programs (the R_MB_ADR , W_MB_ADR , R_MB_REL , W_MB_REL , MSG_N , ARY_N_R , INT_REAL , REAL_INT , UDP_SEND and UDP_RECV).

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1.2 Deliver UDP data from one PAC to a PC

The "faq162_demo.zip" downloaded from FAQ-162 includes one "udp.exe" utility. It can enable one PC as a UDP server to wait and then receive UDP data from one or some PAC. To test it, first prepare one PC and set its IP address to 192.168.1.180 and set the mask address as 255.255.255.0. Then download the "FAQ162A" project to one PAC (IP is 192.168.1.179). Then, open a command shell on PC to run "udp.exe", for example, "udp 12001" which means to enable the PC as a UDP server at port No. 12001. You may test it by change the value in the PAC (for example, change the value of "Long_05" and "Long_08"), then you will see the data received by the "udp.exe"

The screenshot displays the ISaGRAF interface with the 'FAQ162A' project loaded. The 'I/O connection' window shows the following configuration:

- ref = 127A
- this_port = 12001
- this_ip = 192.168.1.179
- Security_passwd = 0
- Send_Time_Gap = 50
- reserved = 0
- port1 = 12001
- to_ip1 = 192.168.1.180
- port2 = 12001
- to_ip2 = N/A
- port3 = 12001
- to_ip3 = N/A
- port4 = 12001
- to_ip4 = N/A
- =TRUE

The 'LIST1 - List of' window shows the following values:

Name	Value
COMING	FALSE
Last_Event_No	0
REAL_01	0
REAL_02	0
REAL_03	0
REAL_04	0
REAL_05	0
Long_01	0
Long_02	0
Long_03	0
Long_04	0
Long_05	123
Long_06	0
Long_07	0
Long_08	-200005
Long_09	0

The command prompt shows the execution of 'udp - udp 12001' and the receipt of two messages:

```

e:\chun_c\udp_test>
e:\chun_c\udp_test>udp 12001

Receive message via UDP/IP, port No.=12001
try to create socket..      Socket Ok.

0:Receive 5 bytes
 35 2C 31 32 33

1:Receive 9 bytes
 38 2C 2D 32 30 30 30 30 35
  
```

Annotations explain the received data:

- For the 5-byte message (35 2C 31 32 33), it means "5,123".
- For the 9-byte message (38 2C 2D 32 30 30 30 30 35), it means "8,-200005".

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1.3 Deliver TCP data from one PAC to a PC

The "faq162_demo.zip" downloaded from FAQ-162 includes one "tcp3.exe" utility. It can enable one PC as a TCP server to wait the PAC to connect it and then receive TCP data from the PAC. To test it, first prepare one PC and set its IP address to 192.168.1.180 and set the mask address as 255.255.255.0. Then download the "FAQ162C" project to one PAC (IP is 192.168.1.179). Then, open a command shell on PC to run "tcp3.exe", for example, "tcp3 14001" which means to enable the PC as a TCP server at port No. 14001. You may test it by change the value in the PAC (for example, change the value of "Long_03" and "Long_09"), then you will see the data received by the "tcp3.exe".

The screenshot displays the ISaGRAF - FAQ162C - Debugger interface. The top window shows the 'I/O connection' settings for the 'tcp3' client, including 'this_ip = 192.168.1.179', 'port1 = 14001', and 'to_ip1 = 192.168.1.180'. Below this, the 'Variable List' window shows the values of various variables, with 'Long_03' set to 789 and 'Long_09' set to -123. A third window, 'Tcp3 - tcp3 14001', shows the command prompt output of the TCP server test. Red arrows point from the variable values in the debugger to the corresponding data received in the command prompt window.

ISaGRAF - FAQ162C - Debugger

File Control Tools Options Help

RUN allowed=0 current=3 maximum=3 overflow=0

ISaGRAF - FAQ162C:LIST1 - List

Name	Value
COMING	
Last_Event_No	0
REAL_01	
REAL_02	
REAL_03	
REAL_04	
REAL_05	
Long_01	0
Long_02	0
Long_03	789
Long_04	0
Long_05	0
Long_06	0
Long_07	0
Long_08	0
Long_09	-123
Long_10	0

ISaGRAF - FAQ162C - I/O connection

File Tools Help

0 ref = 128A

1 Time to Sleep = 40

2 this_ip = 192.168.1.179

3 Security_passwd = 0

4 port1 = 14001

5 to_ip1 = 192.168.1.180

6 Send_Time_Gap1 = 250

7 port2 = 14001

8 to_ip2 = N/A

9 Send_Time_Gap2 = 250

10 port3 = 14001

11 to_ip3 = N/A

12 Send_Time_Gap3 = 250

13 port4 = 14001

Tcp3 - tcp3 14001

```

e:\chun_c\tcp_server\tcp3>tcp3 14001

TCP/IP server testing ...
Create TCP/IP server at port_No=14001

Waiting for client to connect...
Client connected...
1: Recv 5 bytes ...
 33 2C 37 38 39
Send the same data back to the TCP/IP Client ... Send 5 bytes - Ok
2: Recv 6 bytes ...
 39 2C 2D 31 32 33
Send the same data back to the TCP/IP Client ... Send 6 bytes - Ok

```

5 bytes received. It means "3,789"

6 bytes received It means "9,-123"