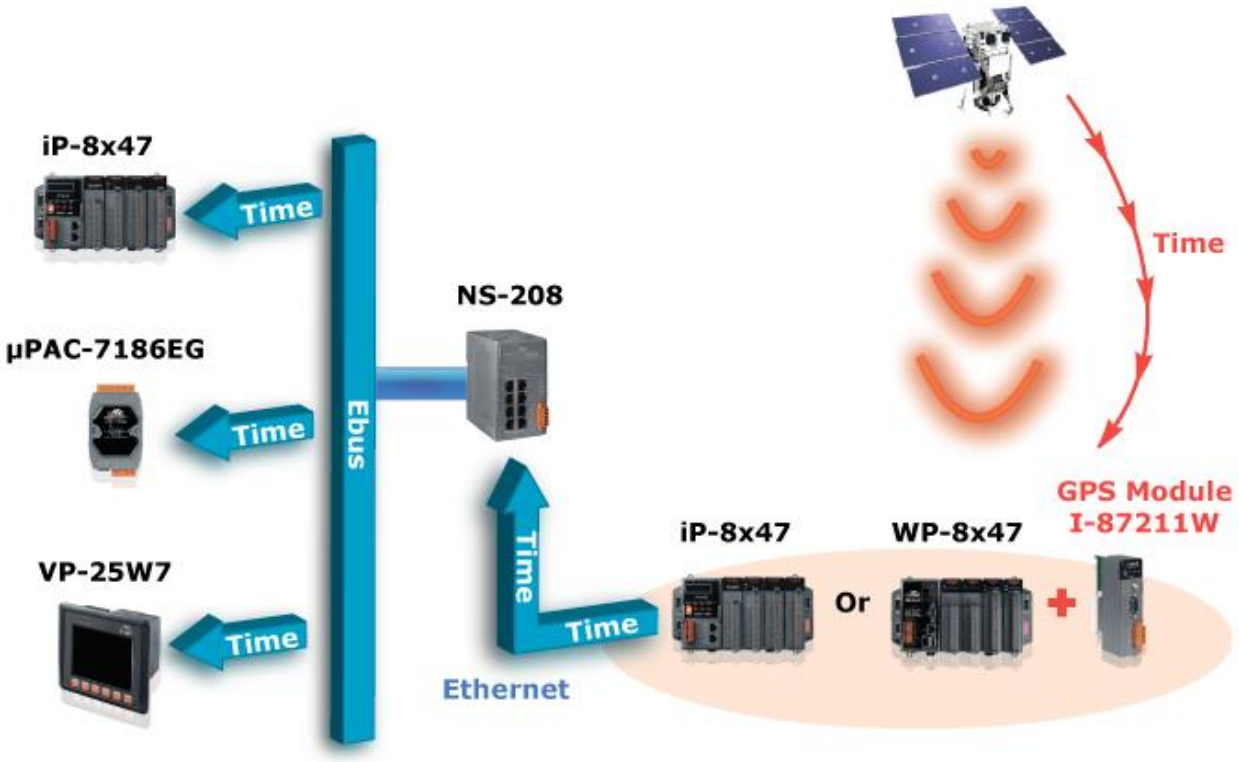
How to adjust the system time of some ISaGRAF PACs via Ebus by using ISaGRAF PAC and I-87211W

Download FAQ-109 Demo

This document shows you how to use the ISaGRAF program in ISaGRAF PAC with the GPS module, I-87211W, to capture satellite time, then adjust the system time of the other ISaGRAF PACs via Ebus.
The ISaGRAF PAC may have difference of about 10 more minutes every half year. This situation sometime cause your system behaviors improperly if it needs some controls based on date and time. To solve the problem, user can use ISaGRAF PAC plus I-87211W GPS module to auto-adjust date and time.

Figure 1:



Please refer to the following website for more information about the ISaGRAF PACs and I-87211W

iPAC-8xx7→ http://www.icpdas.com/en/product/iP-8417
uPAC-7186EG→ http://www.icpdas.com/en/product/uPAC-7186EG
I-87211W→ http://www.icpdas.com/en/product/I-87211W

Please refer to the chapter 7.5 of ISaGRAF User's Manual for using the Ebus.
http://www.icpdas.com/en/download/show.php?num=333&nation=US&kind1=&model=&kw=isagraf

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ISaGRAF program:

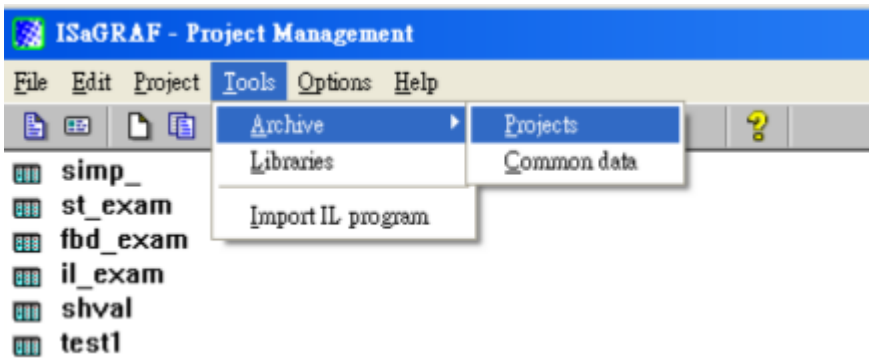
wpdm109m.pia: for getting the satellite time, and then send correct date and time to other ISaGRAF PACs on the same Ebus network.

wpdm109s.pia: for getting the satellite time from Ebus, and adjust the system time if it is different more than 2 seconds from the correct satellite time.

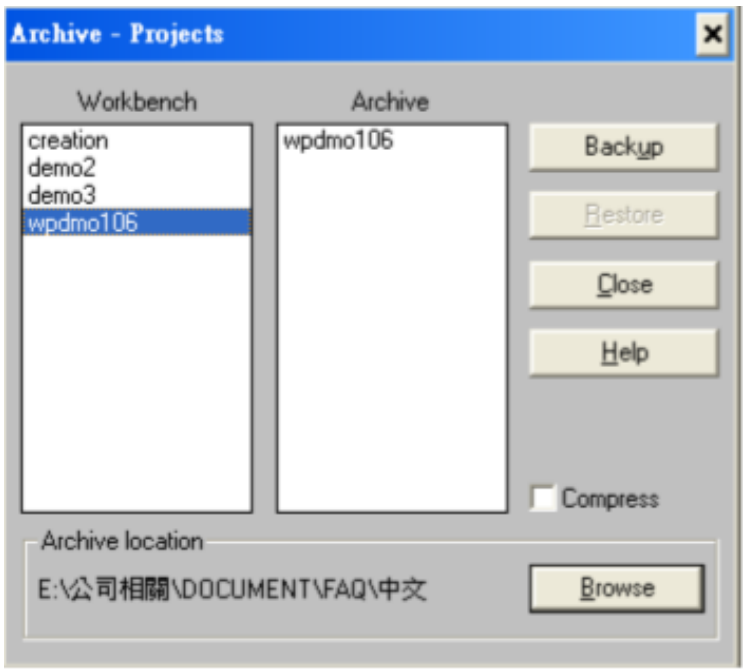
The ISaGRAF demo code “wpdm109m.pia” and “wpdm109s.pia” can be downloaded from http://www.icpdas.com/en/faq/index.php?kind=280#751 > FAQ-109

Please follow below steps to restore the “wpdm109m.pia” and “wpdm109s.pia” to your PC/ISaGRAF:

1. Click Tool→ Archive→ Projects

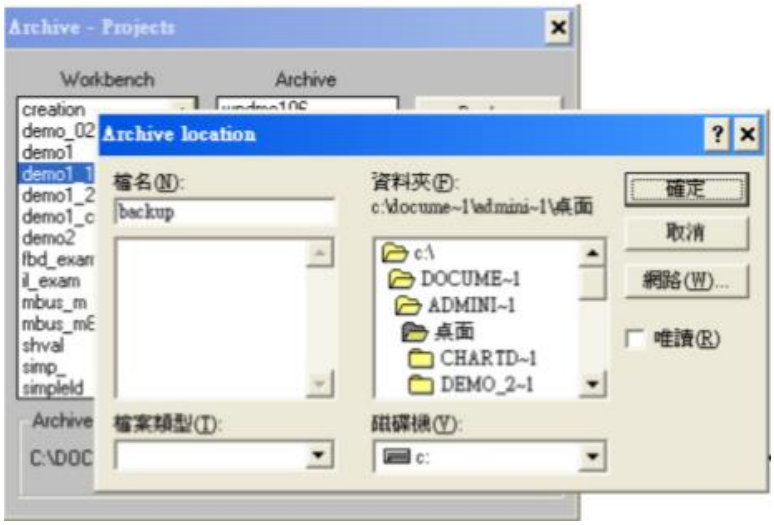


2. Click the Browse button to select the folder

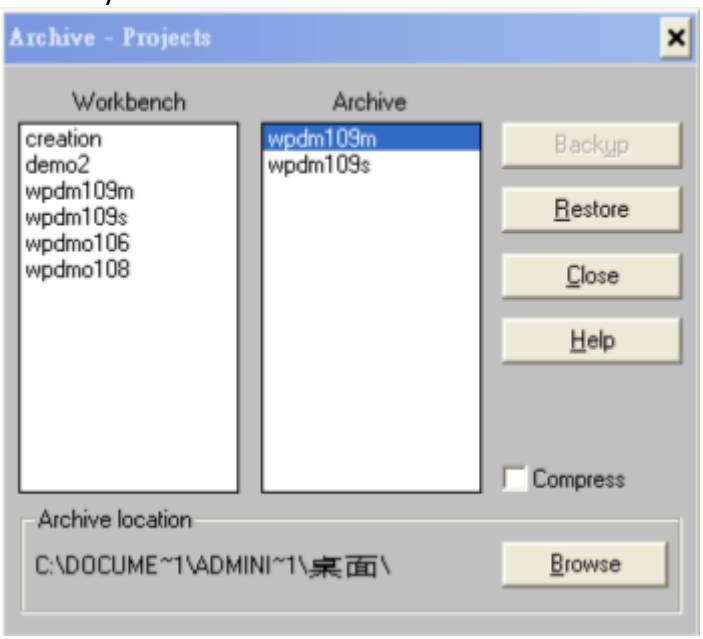


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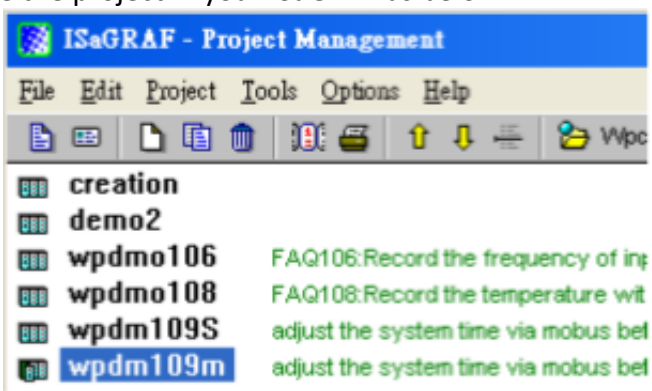
3. Select the folder that contains the “wpdm109m.pia” “wpdm109s.pia” and click the OK button



4. Select the project that you want to restore



5. Then you will see the project in your ISaGRAF as below



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How to test?

Here is using one WP-8xx7 and one uPAC-7186EG.

1. Please insert I-87211W in the WP-8xx7's slot 0, then connect the I-87211W's antenna properly. Please make sure the I-87211W's antenna is visible all the way through the sky. Then connect the WP-8xx7 and uPAC-7186EG to the NS-208 as Figure 1.

2. Download the ISaGRAF project “wpdm109m.pia” to the WP-8xx7.

3. Download the ISaGRAF project “wpdm109s.pia”to the uPAC-7186EG.

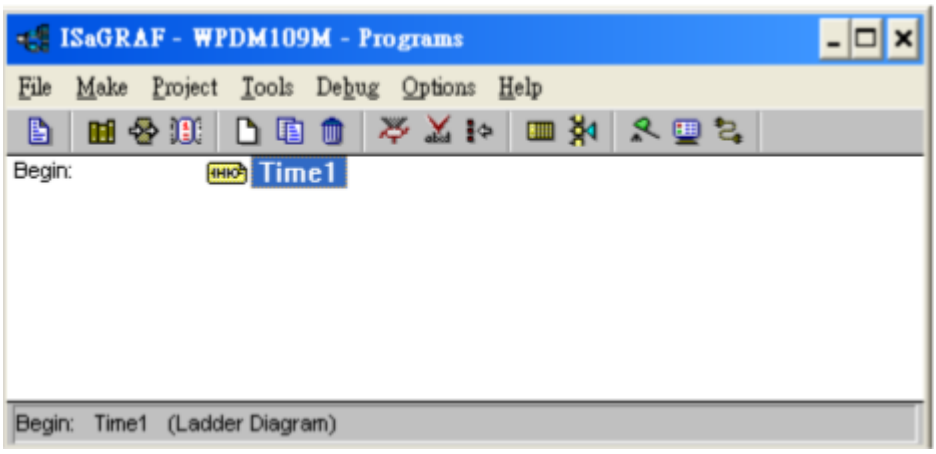
Note that: The uPAC-7186EG and the WP-8xx7 must be in the same subnetwork.
Example: PAC1: Mask: 255.255.255.0 IP: 192.168.1.3 and PAC2: Mask: 255.255.255.0 IP: 192.168.1.5 are in the same subnetwork. PAC1 Mask: 255.255.255.0 IP: 192.168.1.3 and PAC3 Mask: 255.255.255.0 IP: 192.168.3.5 are not in the same subnetwork.

4. Then the programs will adjust the system time automatically via Ebus.

ISaGRAF program: wpdm109m.pia

This program must run in the PAC with the I-87211W installed to capture the satellite time, and then send the time to other PACs via Ebus.

ISaGRAF project architecture: (include one LD program: Time1)



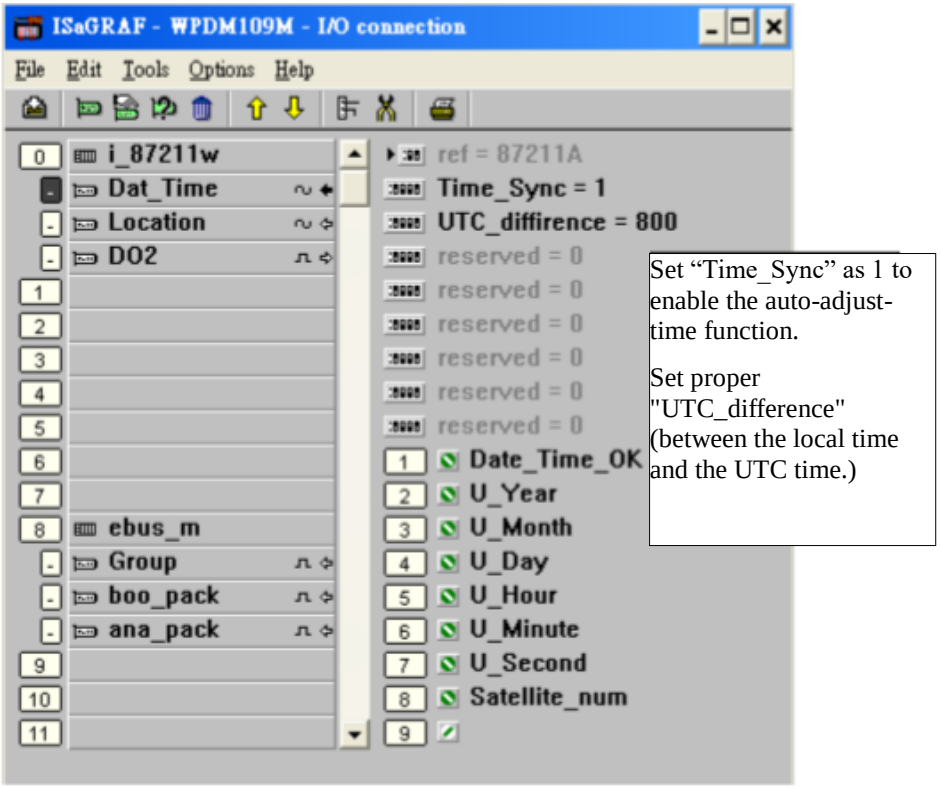
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Variables:

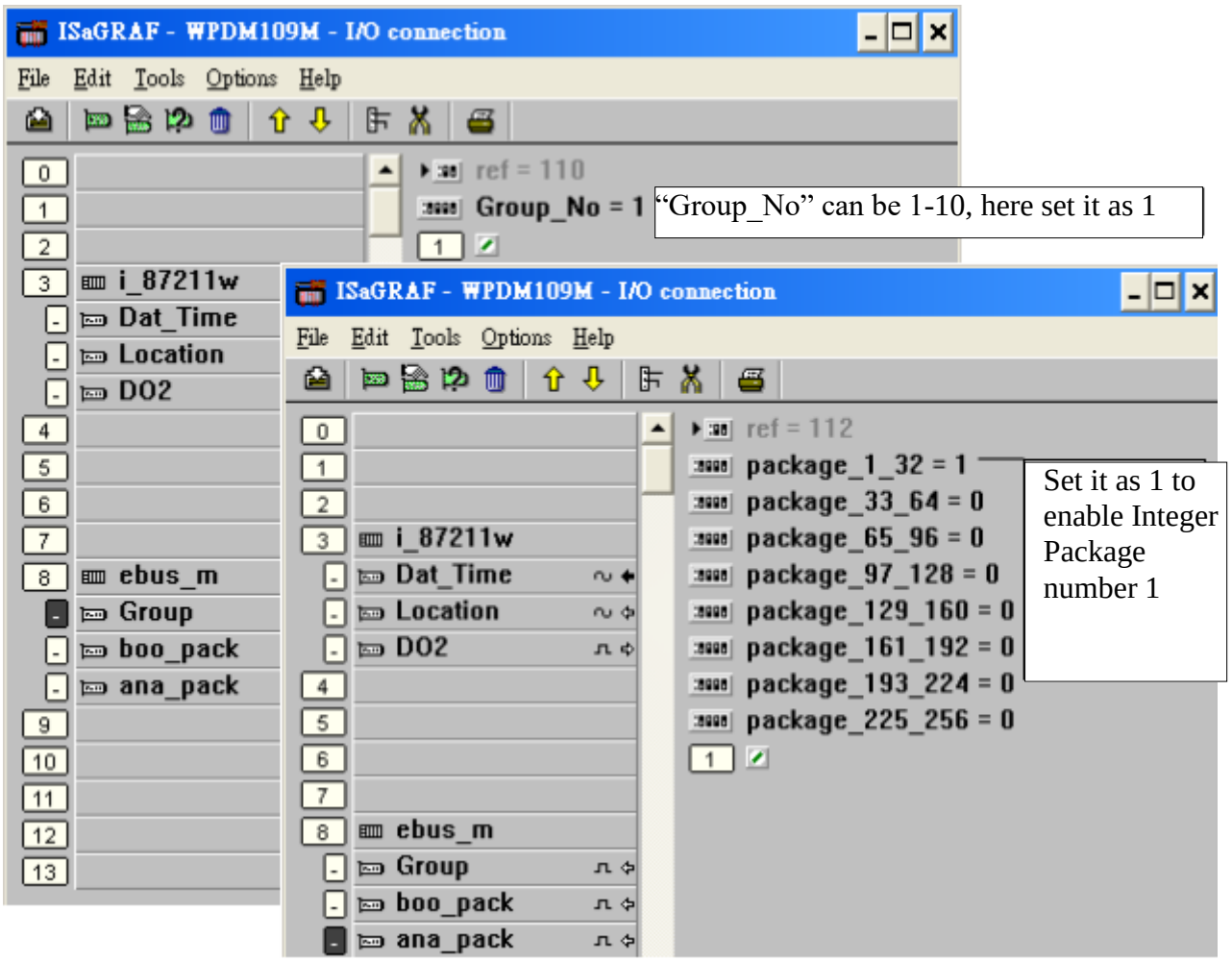
Name	Type	Attribute	Description
Year	Integer	internal	The Year of system time
Month	Integer	internal	The Month of system time
Day	Integer	internal	The Day of system time
Hour	Integer	internal	The Hour of system time
Minute	Integer	internal	The Minute of system time
Second	Integer	internal	The second of system time
U_Year	Integer	input	The Year of the satellite time
U_Month	Integer	input	The Month of the satellite time
U_Day	Integer	input	The Day of the satellite time
U_Hour	Integer	input	The Hour of the satellite time
U_Minute	Integer	input	The Minute of the satellite time
U_Second	Integer	input	The Second of the satellite time
Date_Time_OK	Integer	input	the satellite time is valid or not
satellite_num	Integer	input	The number of satellite signal captured by I-87211W

IO connection:

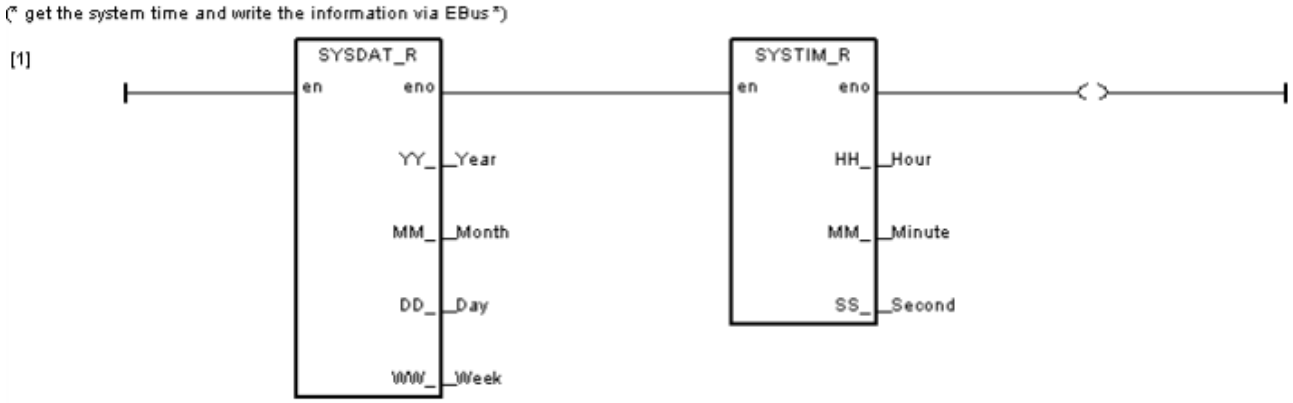
Please refer to the below website for more information of using GPS module I-87211W
http://www.icpdas.com/en/faq/index.php?kind=280#751 > FAQ-107



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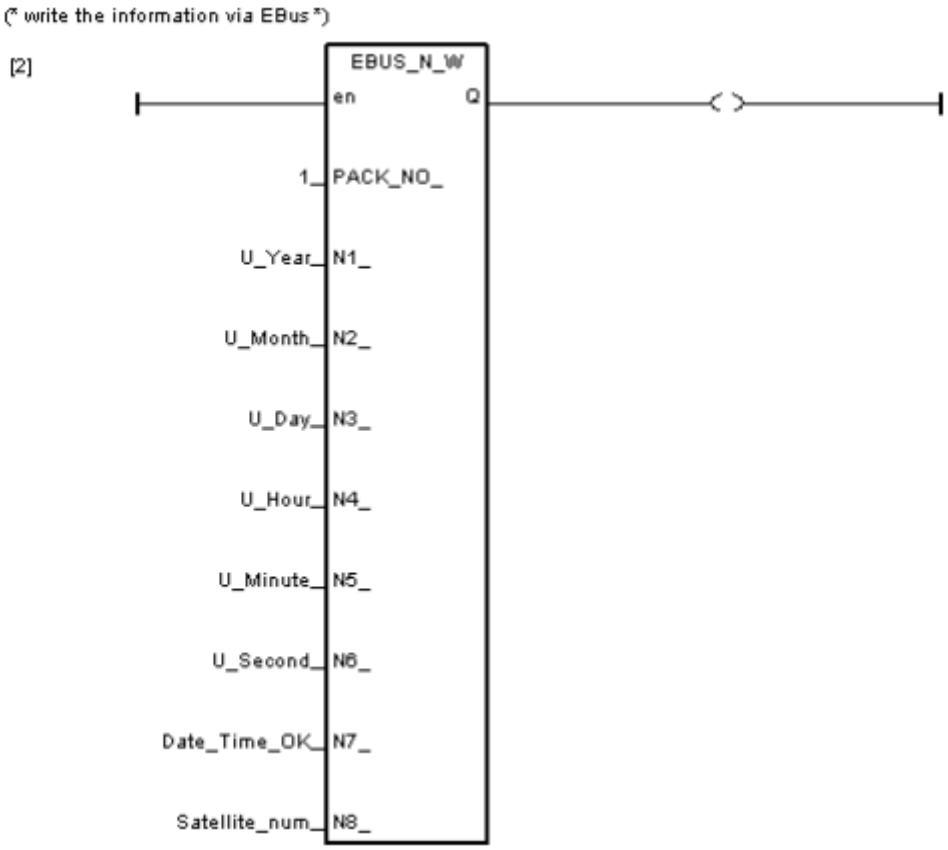


LD program: Time1
Get the system time



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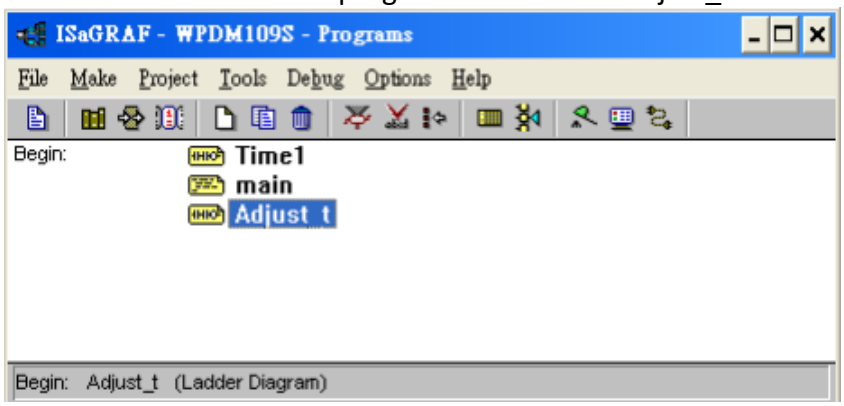
Write the satellite time via Ebus.



ISaGRAF program: wpdm109s.pia

This program is running in the PAC without the I-87211W installed. It gets the correct satellite time form the Ebus. Then adjust its system time automatically if the time difference is more than 2 seconds.

ISaGRAF project architecture: includes two LD programs: Time1 and Adjust_t and one ST program: main



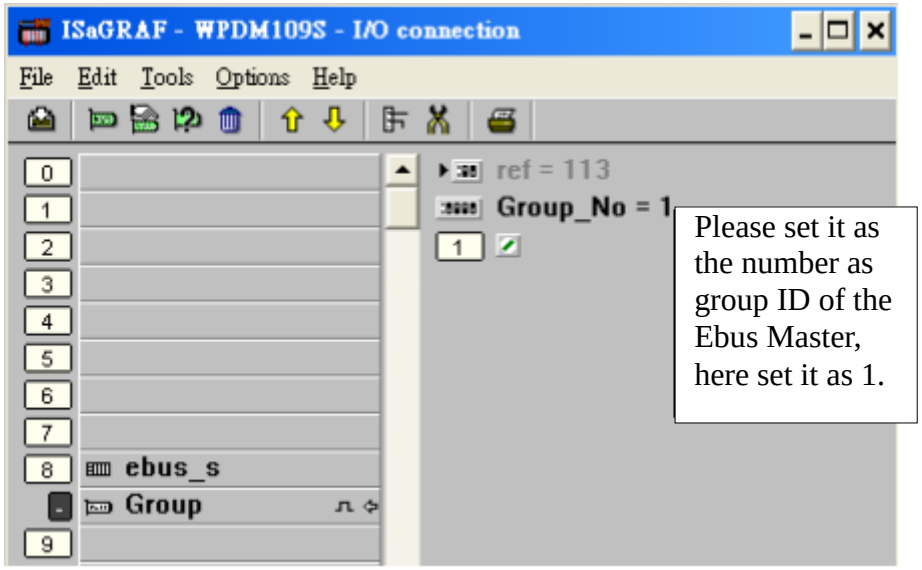
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Variables:

Name	Type	Attribute	Description
status_e	Boolean	internal	The status of Ebus
modify_t	Boolean	internal	When the value change from false to true, the program will write the satellite time to the system time
set_time	Boolean	internal	Check if it is true or not to adjust time
Date_Time_OK	Integer	internal	The satellite time is valid or not. 0: invalid, 1: valid.
Year	Integer	internal	The Year of system time
Month	Integer	internal	The Month of system time
Day	Integer	internal	The Day of system time
Hour	Integer	internal	The Hour of system time
Minute	Integer	internal	The Minute of system time
Second	Integer	internal	The Second of system time
U_Year	Integer	internal	The Year of The satellite time from Ebus
U_Month	Integer	internal	The Month of The satellite time from Ebus
U_Day	Integer	internal	The Day of The satellite time from Ebus
U_Hour	Integer	internal	The Hour of The satellite time from Ebus
U_Minute	Integer	internal	The Minute of The satellite time from Ebus
U_Second	Integer	internal	The Second of The satellite time from Ebus
System_time	Integer	internal	The system time(second)
U_time	Integer	internal	The system time(second)
difference_time	Integer	internal	The difference between the system time and the satellite time (second).

IO connection:

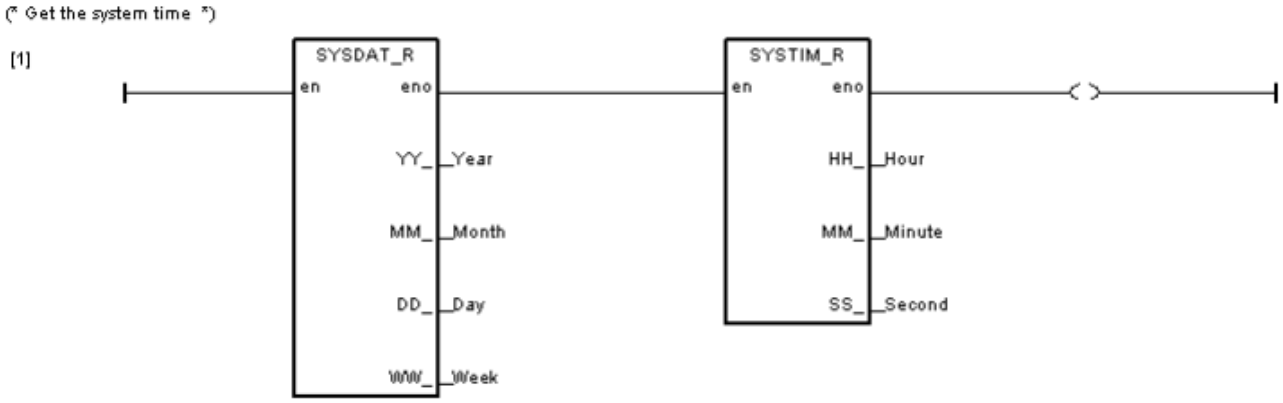
Enable the Ebus slave



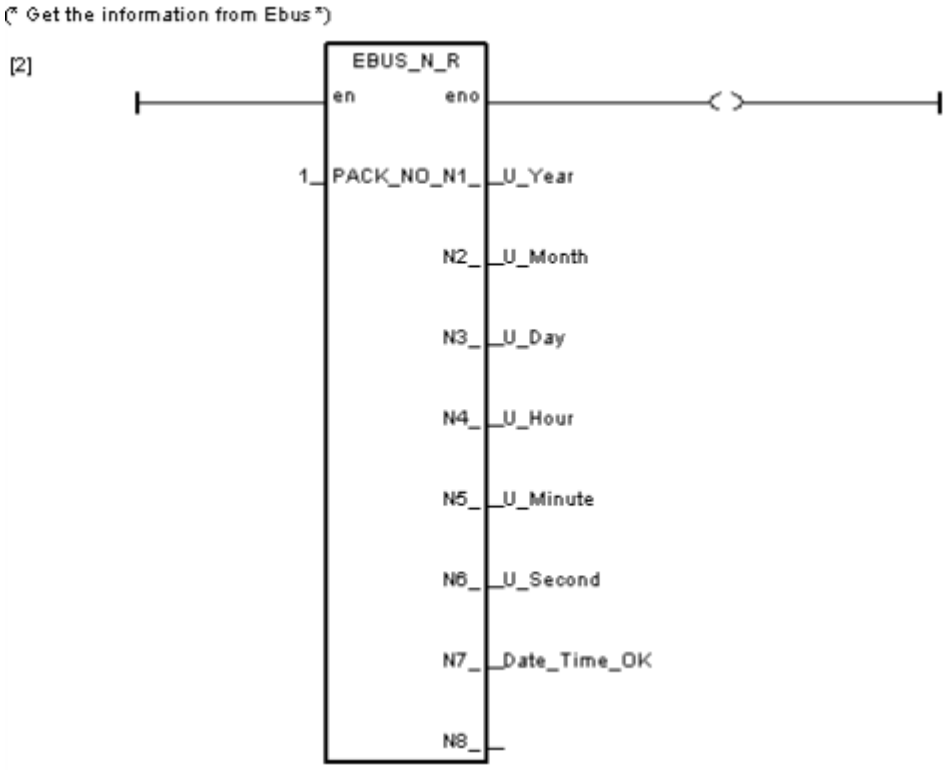
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LD Program: Time1

Get the system time



Get the correct satellite time from Ebus



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ST program: main

```
(* Use the function "Ebus_sts" to get the status of Ebus *)
(* the first parameter is what kind of message, 0 is Boolean, 1 is Integer *)
(* the second parameter is the number of message *)
status_e:= Ebus_sts(1,1);

(* if set_time is true, then do as follows *)
if set_time then
 (* check if the status of Ebus and Date_Time_OK is OK *)

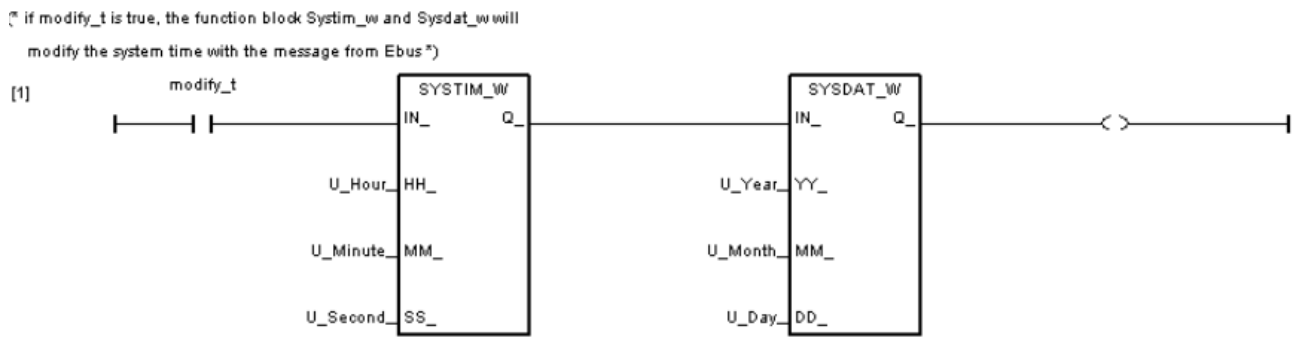
 if status_e and Date_Time_OK = 1 then
  (* Transfer the unit of the time to seconds *)
  System_time:= Hour * 3600 + Minute * 60 + Second;
  U_time:= U_Hour * 3600 + U_Minute * 60 + U_Second;

  (* Check which one is bigger, and calculate the difference between System_time and U_time *)
  if System_time > U_time then
    difference_time:= System_time - U_time;
  else
    difference_time:= U_time - System_time;
  end_if;

  (* check the difference between Sys_time and U_time is bigger than two *)
  (* check it is different between the system date and U_Date *)
  if difference_time >= 2 or Day <> U_Day or Month <> U_Month or Year <> U_Year then
        (* set modify_t as true to revise the system time *)
        modify_t:= true;
  end_if;
 end_if;
end_if;
```

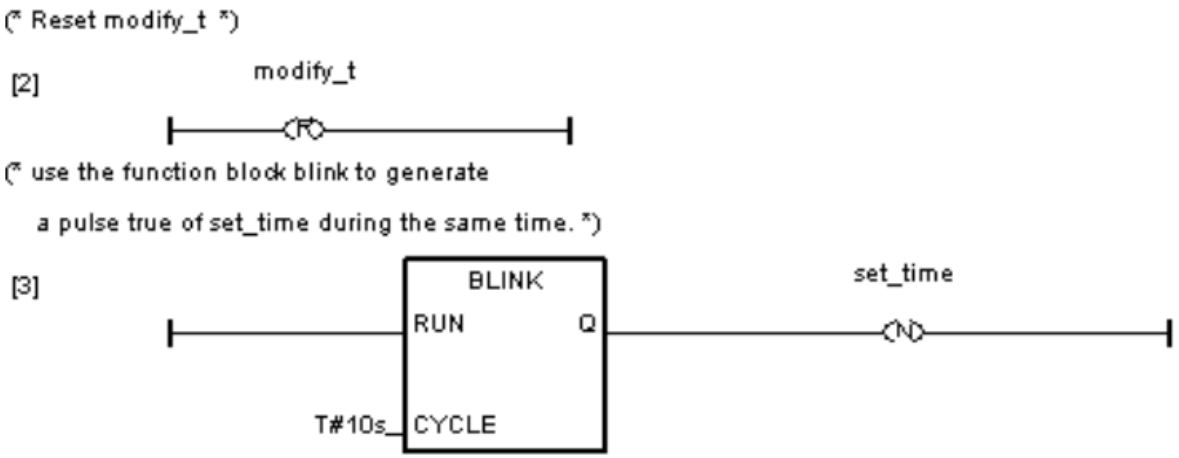
LD program: Adjust_t

If “modify_t” is rising from false to true, the function block “systim_w” and “sysdat_w” will write the correct time to its RTC.



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If “modify_t” is true, reset it to false.
The function block “Blink” will generate a pulse true to “set_time” every ten seconds.
Then the ST program: main will check the system time is correct or not every ten seconds。



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